adani

Ports and Logistics

एकीकृत क्षेत्रीय कार्यालय, गाँधीनगर
Integrated Regional Office, Gandhinagar
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय,
Ministry of Environment, Forest & Climate Change
भारत सरकार/Govt. of India
कक्ष क्र. 407 व 409 ए विंग, आरण्य भवन
Room No.407 & 409, A wing, Aranya Bhawan
गाँधीनगर (गुजरात)/Gandhinagar (Gujarat)
07/12/21

APSEZL/EnvCell/2021-22/083 **Date:** 27.11.2021

To
The Inspector General of Forest / Scientist C,
Integrated Regional Office (IRO),
Ministry of Environment, Forest and Climate Change,
Aranya Bhawan, A Wing, Room No. 409,
Near CH 3 Circle, Sector – 10A,
Gandhinagar – 382007.
E-mail: eccomplinace-guj@gov.in, rowz.bpl-mef@nic.in

Sub : Half yearly Compliance report for Environment and CRZ Clearance for "Water Front Development Project at Mundra, Dist. Kutch, Gujarat.

Ref : i) Environment and CRZ clearance granted to M/s Adani Ports & SEZ Limited vide letter dated 12th January, 2009 and 19th January, 2009 bearing MoEF letter No. 10-47/2008- IA.III.
ii) Environment and CRZ clearance Extension order granted to Water Front Development Project at Mundra in Kutchh District (Gujarat) vide letter dated 7th October, 2015 bearing MoEF letter No. 10-47/2008- IA.III.
iii) MoEF&CC's Order dated 18.09.2015

Dear Sir,

Please refer to the above cited reference for the said subject matter. In connection to the same, it is to state that copy of the compliance report for the Environmental and CRZ Clearance for the period of April-2021 to September-2021 is being submitted through soft copy (e-mail communication & CD).

Kindly consider above submission and acknowledge.

Thank you,
Yours Faithfully,
For, **M/s Adani Ports and Special Economic Zone Limited**

Shalin Shah
Head – Environment & Sustainability

Encl: As above

Copy to:

1) The Additional Secretary, MoEF&CC, Regional Office (WZ), E-5, Kendriya, Paryavaran Bhawan, Arera Colony, Link Road No. – 3, Bhopal – 462016.
2) The Director (IA Division), Ministry of Environment, Forests & Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi-110003.
3) The Zonal Officer, Regional Office, CPCB – Western Region, Parivesh Bhawan, Opp. VMC Ward Office No. 10, Subhanpura, Vadodara – 390023.
4) The Member Secretary, GPCB – Head Office, Paryavaran Bhavan, Sector 10 A, Gandhi Nagar – 382010.
5) The Director, Forests & Environment Department, Block – 14, 8th floor, Sachivalaya, Gandhi Nagar – 382010.
6) The Regional Officer, Regional Office GPCB (Kutch-East), Gandhidham – 370201.

Adani Ports and Special Economic Zone Ltd
Adani House,
PO Box No. 1
Mundra, Kutch 370 421
Gujarat, India
CIN: L63090GJ1998PLC034182

Tel +91 2838 25 5000
Fax +91 2838 25 51110
info@adani.com
www.adani.com

Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad – 382421, Gujarat, India

Chiragsing Rajput

From:	Chiragsing Rajput
Sent:	Tuesday, November 30, 2021 7:05 PM
To:	eccompliance-guj@gov.in; rowz.bpl-mef@nic.in
Cc:	ec-rdw.cpcb@gov.in; 'ro-gpcb-kute@gujarat.gov.in'; ms-gpcb@gujarat.gov.in; 'mefcc.ia3@gmail.com'; 'monitoring-ec@nic.in'; direnv@gujarat.gov.in; Snehal Jariwala
Subject:	Half Yearly EC Compliance Report Submission - APSEZ, Mundra - WFDP 2009 (Apr'21 to Sep'
Attachments:	5. EC Compliance Report_WFDP-2009_Apr'21 to Sep'21.pdf

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APSEZL/EnvCell/2021-22/083

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Shalin Shah
Head – Environment & Sustainability

Encl: As above

Copy to:

1) The Additional Secretary, MoEF&CC, Regional Office (WZ), E-5, Kendriya, Paryavaran Bhav

Thanks & Regards,
Chiragsing Rajput
Environment Cell | Adani Ports & Special Economic Zone Ltd.
Mob +91 9687678443 | Ext. 59523 | chiragsing.rajput@adani.com | www.adani.com
Adani Corporate House, 8th Floor, East Wing, Shantigram, Ahmedabad - 382421, Gujarat, India.

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APSEZL/EnvCell/2021-22/083 **Date:** 27.11.2021

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Ports and Logistics

Environmental Clearance Compliance Report

Waterfront Development Project, Mundra, Dist. Kutch, Gujarat

Adani Ports and SEZ Limited Mundra, Kutch

For the period of
April-2021 to September-2021

Index

Compliance Report of Environmental and CRZ Clearance

adani Ports and Logistics	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'21 To : Sep'21

Status of the conditions stipulated in Environment and CRZ Clearance

The name of the company was changed from **"Mundra Port and Special Economic Zone Limited"** to **"Adani Ports and Special Economic Zone Limited"** on 6th January, 2012.

Activities/facilities approved, major components completed and proposed future activities as per Environment and CRZ Clearance are as below:

Description (Type of Facility or Berth)	Approved Berths or Length as per Environmental & CRZ Clearance	So far Developed and In Operation
	Nos. of Berths or Length	Nos. of Berths
Multipurpose	4 (550 m + 2 Berths)	4
Container	16 (2680 m + 2000 m)	7 (2110 m)
Ro-Ro	2	-
Coal	6	4
Dry-Bulk Cargo	5	-
Liquid/POL	9*	-
LNG	2	Developed and operated by GSPC LNG Limited as per separate permissions obtained and NOC given by APSEZ
Light & Heavy Engineering	2	-
Port Craft	1 (330 m)	-
Shipyard	2	-

* Liquefied Petroleum Gas (LPG) Terminal has been developed by M/s. Mundra LPG Terminal Pvt. Ltd. under Waterfront Development Project of Adani Ports and SEZ Limited and LPG is being handled at existing Multipurpose Terminal APSEZ. M/s. Mundra LPG Terminal Pvt. Ltd is 100% subsidiary of APSEZ.

In addition to above berths or facilities, following components were also approved.

1. Dredging Quantity: 210 Mm^3. Overall dredging to the tune of 123 Mm^3 is completed till date.
2. Back-up area, back-up facilities like railway line, rail sidings, rail truck loading, open paved areas, associated buildings, utilities, amenities, etc. and connectivity to rail and road corridor for each port were approved and majority of them are constructed and in operation. Remaining facilities will be developed based on future requirements.
3. Seawater intake channel and outfall channel for power plants, desalination plants (47 MLD is operational out of 300 MLD) and other industrial requirements approved and is already in operation.

Note:

- APSEZ has applied for EC & CRZ Clearance for expansion of Waterfront Development Project vide dated 7th March, 2019.
- MoEF&CC has issued Terms of Reference (ToR) vide Ref. – F. No. 10-24/2019-IA-III dated 17th May, 2019 and it is further amended on 27th Sep, 2019 & 10th April, 2020.

Half yearly Compliance report for Environment and CRZ Clearance for the project "Water Front Development Project (WFDP) at Mundra, Dist. Kachchh, Gujarat of M/s. Adani Ports and SEZ Limited"

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
Specific Conditions		
i	No existing mangroves shall be destroyed during construction / operation of the Project.	Complied. **<u>Conservation of mangroves:</u>** • In and around APSEZ, approx. 1800 ha. mangrove area was identified by NIO in an EIA report prepared the year 1998. • Out of this 1800 ha area, 1254 ha area was further demarcated as potential mangrove conservation by NIO in the year 2008 (as part of the EIA report of WFDP). • It may be noted that the entire area of 1254 ha is not covered with mangroves. • Entire area is being conserved and there is no disturbance to the mangroves in this area. Measures such as restricted entry and regular surveillance have resulted in overall growth of mangroves within this area. • As per MoEF&CC directive, APSEZ entrusted NCSCM to demarcate mangroves in and around APSEZ area. As per their study, presently, mangrove cover in and around APSEZ was over 2340 ha. The analysis of the comparison between 2011 and 2016-17 has shown an overall growth of 246 ha. NCSCM final report on comprehensive and integrated plan for preservation and conservation of mangroves and associated creeks in and around was submitted along with half yearly EC Compliance report for the period Apr'19 to Sep'19. The same was further submitted to GCZMA and MoEF&CC for their examination and recommendation vide (with a copy to MoEF&CC vide letter dated 04.06.2018 & reminder letter vide dated 4th Jan, 2019). Presentation on the findings of the report was made to GCZMA committee on 4th October 2019 and the recommendation for the same has been received vide email dtd 22nd Sept, 2020 with conditions, which was submitted as a part last half yearly EC compliance report for the period Oct'20 to Mar'21.

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 30-09-2021</th></tr>
<tr><td></td><td></td><td>As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.
<table>
<tr><th>Sr. No.</th><th>Recommendations</th><th>Compliance</th></tr>
<tr><td>1.</td><td>Mangrove mapping and monitoring in and around APSEZ</td><td>• APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island.
• As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 & 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.7%.
• This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion of scattered to sparse which also shows that the growth of mangroves in a progressive direction.
• Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019.
• The cost of the said study was INR 23.56 Lacs incurred by APSEZ.</td></tr>
<tr><td>2.</td><td>Tidal observation in creeks in and around APSEZ</td><td>• APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM.
• The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves.
• The cost of the said activity was INR 1.0 Lacs.</td></tr>
<tr><td>3.</td><td>Removal of Algal and Prosopis</td><td>• Algal and Prosopis growth monitoring was done in and around</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 30-09-2021</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td></td><td>growth from mangrove areas</td><td>mangrove area and algal encrustation was found in some of the mangrove areas, which has been removed manually.
• The cost of the said activity was INR 1.2 Lacs.</td></tr>
<tr><td>4.</td><td>Awareness of mangroves importance in surrounding communities</td><td>• Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the community regarding importance of mangroves.
• Adani Foundation has also provided 8.95 lacs kg Dry Fodder and 24.25 lacs kg Green fodder in 21 villages of Mundra and Anjar Block to support the resource dependent villagers, to avoid their dependency on mangroves. The expenditure for fodder supporting activities was approx. 122.7 Lacs during FY 2021-22 (Till Sep'21).
• Village Gauchar land development for the fodder cultivation to made fodder sustain village & Avail green fodder in scarcity phase. With the support of Gauchar Seva Samiti Grassland development in Siracha – 85 Acre & Zarpara – 25 Acre done which resulted in total production of 82 ton.
• Other than this dedicated security guard with gate system deployed by APSEZ across the coastal area and no any unauthorized persons allowed within coastal as well as mangrove areas.
• Refer CSR report attached as Annexure – 1.</td></tr>
</table>
Details of activities done as a part of GCZMA recommendations and NCSCM mangrove conservation action plan were submitted as a part of last half yearly EC compliance report for the period Oct'20 to Mar'21.
</td></tr>
<tr><td>ii</td><td>There shall be no filling up of the creek and reclamation of the creeks.</td><td>Complied.

<u>Conservation of creeks:</u>
• The prominent creek system (main creeks and small branches of creeks) in and around APSEZ are: (1) Kotdi</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
		(2) Baradimata (3) Navinal (4) Bocha (5) Mundra (Oldest port (Juna Bandar) leading to Bhukhi river). • All above creek mouths are open allowing free flow of water in to the creeks and surrounding areas and there is no filling or reclamation of any creek area. • This aspect is also confirmed from the recent study of NCSCM in 2017-18, which highlights the bathymetry data of the entire coast around APSEZ. • From the bathymetry data it can be concluded that there are sufficient depths at the creek mouths and all creek mouths are open allowing flushing of water. • APSEZ has so far constructed 19 culverts having total length of approx. 1100 m with total cost of INR 20 Crores. Three RCC Bridges have also been constructed over Kotdi creek with total length of 230 m and cost of INR 10 Crores. Photographs showing the same were submitted along with half yearly compliance report for the period Apr'17 to Sep'17. • Please refer condition no. i of EC & CRZ compliance report for further details.
iii	The Project proponent shall comply with all the Orders/directions of the Honorable High Court of Gujarat and Supreme Court in the matter.	Complied. There are three ongoing matters pending (Two pending at High Court and other pending at Supreme Court). Updated details of the same are attached as **Annexure – 2**.
iv	Adequate safety measures for the offshore structure and ship navigation shall be taken in view of the High Current in the area.	Complied. The hydrodynamic study for the waterfront area has been carried out by HR Wallingford, a maritime design expert. As per the recommendations in their report, the following safety measures are implemented. 1. The alignment of the berth has been kept in line with the current flow in order to reduce the effect of current on vessels moored alongside. 2. The breasting dolphins have been designed in such a configuration so as to provide appropriate lead to the vessels mooring ropes. 3. The berth being in line with the current flow will facilitate Pilotage operation and provide better maneuverability of vessels.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
		4. The strength of the berth structure has been calculated to absorb the energy transferred to fenders while berthing of tanker vessels at the terminal. 5. Navigational buoys and lead lights marking the channel and clearing distance off the breakwater are installed. 6. The strength of the fenders at the berth and the SWL of the bollards / winches are sufficient to absorb the forces of vessels alongside keeping in mind the monsoon weather conditions. 7. Sufficient depths are maintained at all times to ensure 10% UKC at the time of berthing / un-berthing. 8. The capstans / winches / bollards are of adequate strength with respect to the vessels being handled. 9. The berth has been designed at an appropriate distance from the existing berths at MMPT-1 in order to safely allow berthing / un-berthing of vessels at MMPT-1 with vessels berthed at the South Port tanker terminal. 10. Berths have been planned close to the breakwater as there is a reduced strength of current along the coastline.
v	The shore line changes in the area shall be and monitored periodically the report submitted every 6 months to Regional Office Bhopal.	Complied. Shore line change aspect has been studied in detail as part of following two studies; • Bathymetry & Topography study, preparation of plan for protection of creeks/ mangrove area including buffer zone, mapping of co-ordinates, running length, HTL, CRZ boundary. • A Regional Impact Assessment study to identify impacts of all the existing as well as proposed project activities in Mundra region. As per the outcome of these studies, no erosion is observed on the coast of the project area. As part of the Regional Impact Assessment study, the possible changes in shoreline that may occur due to the proposed developments in 10 km area on either side of the waterfront development project have been predicted. It has been inferred from the modelling study that the shift in the shoreline will be less than 0.5 m/year, which reconfirms that the APSEZ facility would pose

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
		insignificant impact on the Mundra shoreline. Accretion is observed at South port and at West port due to approved reclamation activities. Based on the study outcome, it is recommended to map the coastal morphology (shoreline change) at least once in three years. The said recommendation will be implemented and the next shoreline change assessment will be carried out during current year i.e. 2021-22. However, shoreline change study was carried out by M/s. Chola MS, Chennai (NABET accredited consultant) as a part of Waterfront Development Project – Expansion EIA study. The summary of the said study are as below. To estimate the shoreline change due to the earlier approved waterfront development plan, a historical shoreline change assessment has been undertaken using the satellite imagery for a period of 2008 to 2018. In order to avoid any major errors in estimating the shoreline, the satellite data for similar tidal condition was considered for 2008, 2013 and 2018. AMBUR Methodology was used to study the historical analysis 10 km radius stretch of shoreline on either side of the APSEZ project boundary has been considered for assessing the historical shoreline change scenario. The baseline shoreline change assessment depicts the influence of both natural causes and also possible changes in the shore due to various development activities in the study area during the designated period. For the purpose of this study, shoreline on left side of APSEZ is termed as West Side Shoreline and that of the right side as East Side Shoreline for ease of recognition. The maximum accretion and erosion rate of the west side shoreline over a period of 10 years during the year 2008 – 2018 are observed to be 4.78 m/yr and 1.93 m/yr respectively. The maximum accretion and erosion rate of the east side shoreline over a period of 10 years during the year 2008

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
		– 2018 are observed to be 0.5 m/yr and 0.82 m/yr respectively. Please refer **Annexure – B** (Compliance of MoEF&CC Order dated 18th Sep, 2015) for further details regarding the mentioned studies.
vi	The recommendations of the risk assessment shall be implemented; any change in the design of the project shall come before the committee for seeking necessary approval.	Complied. Risk Assessment was carried out at the time of preparation of the EIA report for the Liquid Berths and LNG terminal. However, it may be noted that liquid berths are not yet developed. Hence recommendations of Risk Assessment will be implemented once the liquid berths & pipelines are developed by APSEZ. The LNG terminal is constructed by GSPC LNG Ltd. and a separate Environment and CRZ clearance is obtained by them. Please refer general condition no ix below for details regarding the same. LPG is being handled from the existing multipurpose terminal. A detailed risk assessment study as per MoEF&CC letter no. F. No. 10-47/2008-IA-III dated 31st May, 2016 was carried out by iFluids Engineering for handling as well as storage activities. Recommendations of the risk assessment have been implemented as part of the construction activity and details of the same were submitted along with half yearly compliance report for the period Oct'18 to Mar'19. Reports of the same were submitted to MoEF & CC along with half yearly compliance report for the period Apr'17 to Sep'17.Implantation report of risk assessment study during operation phase was submitted along with half yearly compliance report for the period Oct'19 to Mar'20. There are no other activities which attract requirement of Risk Assessment.
vii	Mangrove plantation of 200 ha to be done in consultation with GEER / GEC of Forest Department, a detailed plan shall be	Complied. APSEZ has consulted Gujarat Institute of Desert Ecology (GUIDE) as they are one of the authorized agencies of Dept. of Forest & Env., Govt. of Gujarat for carrying out

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
	submitted within six months from the date of receipt of this letter.	mangrove afforestation. GUIDE has completed mangrove plantation in an area of 200 ha at Jakhau, Gujarat during the year 2012-13. Copy of the mangrove plantation completion certificate was submitted along with EC compliance report for the period Apr'18 to Sep'18. Total expenditure for the said work was INR 40 lakh. It may be noted that to enhance the marine biodiversity, till date APSEZ has carried out mangrove afforestation in 2890 ha. area across the coast of Gujarat. Total expenditure for the same till date is INR 832 lakh. Details on Mangroves afforestation & Green belt development carried out by APSEZ till date is annexed as **Annexure – 3**. Other than this Adani Foundation – CSR Arm of Adani Group at Mundra-Kutch has initiated multi-species plantation of mangroves in Luni village in association with GUIDE, Gujarat. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. Current year 3 ha development is planned to extend multi-species mangrove plantation. Please refer attached **Annexure – 1** for CSR activity report carried out by Adani Foundation.
viii	It shall be ensured that during construction and post construction of the proposed jetty the movement of fishermen vessel of the local communities are not interfered with.	Complied. During project proposal, APSEZ proposed to provide four (4) dedicated accesses at Juna Bandar, Luni, Bavdi Bandar and Zarpara for the fishermen to approach the sea for fishing activity. However, during construction as well as operation, through fishermen consultative process, so far APSEZ has provided seven (7) access roads instead of four (4). Total length of all the approach roads is approx. 23 Kms and expenditure involved is Rs. 637 Lacs. There is no hindrance to the movement of fisherman boats. APSEZ is actively working with local community around the project area and provides required support for their livelihood and other concerns through the CSR arm –

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Adani Foundation. Adani Foundation is working in main four persuasions as below.

- Education
- Community Health
- Rural Infrastructure
- Sustainability Livelihood

Brief information about activities in the main four persuasions is mentioned below. Other than this, Adani Foundation has also worked for fight against COVID – 19 pandemic situations during this compliance period Activities carried out for the same are summarized as below.

<table>
<tr><th>Area</th><th>Activity</th></tr>
<tr><td>Fight Against COVID-19</td><td>• Started Covid care centre service at Samudra town ship to Provide medical services at 24 x7 hrs. Home Visit for Medical Prescription and advise for further treatment & co-ordination.
• AF team voluntary performed patients care and co-coordination duty at GKGH, Bhuj for 23 days.
• AHMPL, Mundra was converted into Covid Hospital with 100 bed Facilities with oxygen to extend Covid medical treatment over community. All related coordination done by our team for more than 353 OPD and IPD.
• Provided Oxygen Concentrator machines for Home isolated patients resulted in goodwill.
• Provide Dead body van service to shift covid demise patients to Crematorium with all dignity.
• Precautionary voice message dissemination through Awaj de voice message service Over Community.
• Started Village Sanitizing activities and Ukalo, Vitamin C tablet distribution</td></tr>
<tr><td>Community Health</td><td>• Mobile Heath Care Units and Rural Clinics
• 9 Rural Clinics
• 06 from Mundra, 02 from Anjar & 01 from Mandvi block treated;
• 3843 patients
• 31 villages covered, with 94 types of general and lifesaving medicines through Mobile healthcare unit
• 3364 patients benefited during six months
• 06 patients are provided Dialysis treatment at 133 times with nominal charges at Adani Hospital.
• 471 –Economically Challenged patients have been supported for operation, OPD, IPD, Medicines and lab-test.
• For Preventive health care General and multispecialty camps Pediatric camp, General Health camps in 9</td></tr>
</table>
</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021	
			villages and Super specialist camp which benefitted more than 1100 patients of Mundra Taluka. • 16 Senior Citizens have been linked with Government Niradhar pension scheme, 34 senior Citizens linked up with Ayushman Yojana and 67 Senior Citizens were referred to GKGH Bhuj for chronic illness.
		Sustainable Livelihood – Fisher folk, Agriculture & Women	• Average 75 KL of water was supplied to 676 households at 5 fisherman vasahat on a daily basis under Machhimar Shudhh Jal Yojana and other 4 fisherman vasahat has linkaged with water through d Mundra Gram Panachayat from which 355 households get benefited. • 11 Fisher Youth were interviewed among that 5 have been selected. Our target is to support 60+ Fisherman in alternative livelihood till March 2022. • Facilitation of Pagadiya Welfare scheme & boat license sanction letter to 06 Fishermen. Till date 59 Form has been submitted to fisheries department, Bhuj for pagadiya and boat License. • During the Taukate cyclone fishermen family had been shifted to safe Places As well as support to disaster management team for advance preparation. • To promote Natural farming Adani Foundation has originated cow-based farming initiative with interconnected techniques which can increase farmer yield. • 23 wormicompost unit have been set-up. Which is facilitated through Government with farmer Contribution. • 50 Farmers have started to preparing Jiva Mrut & Gaukrupa Amrutam Bio-fertilizer and using in agricrop. Series of Training is arranged by ATMA and Adani Foundation. • Two Farmers Groups is registered with ATMA–Agricultural technology management Agency–it will leverage Government schemes. • Adani Foundation provides Good Quality dry and green fodder to 24 Villages. Project is covering total 14116 Cattels / 3008 farmers and hence enhancing cattle productivity. Dry Fodder 895398 Kg Green – 2425230 Kg. • Fodder Cultivation-To made fodder sustain villages - 25 Acre Gauchar land of Siracha village is being cultivated for the same. • Current year for the dates Packaging and Marketing, KKPC Started to sell 10 Kg capacity packaging Box at Minimum Profit Margin At Rs.29/Boxes which resulted in turn over of Rs. 24 Lacs with Profit of 1 Lac. This initiative has supported more than 1800 farmers indirectly. • Dragon fruit farming is on going by Five farmers each farmer is doing in 2 Acre farm –Total 11000 plants. • Skill Development and Income Generation –Adani Foundation is working with 15 Self help group and supporting to develop entrepreneur skills to become

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			self reliant, sourcing more than 350 women to absorb in various job.
		Education	• The Virtual and Offline classes (Shrisikshan) with parents permission with all precautionary measures as Government Guide Lines. Its very encouraging that inspired by Our Sheri Sikshan Initiative-Gov Teachers also started same approach. • Online Outreach – 259 Students • Individual Home visit – 415 Students • Sheri sikshan and school students - 838 Students • Uthhan First phase 17 Schools and 2951 students were part of the program, and second phase 14 Schools and 1952 Students were part of the programme. Total 4903 students are getting benefit from Utthan. • Coaching of 49 students for National Means cum Merit Cum Scholarship Scheme (NMMS). • Coaching of 34 Students for Javahar Navoday Entrance Exam by Utthan Sahayak since last Three Months. • Total 394 webinar and capacity building program were arranged for Utthan Sahayaks and Government Officers. • Arranged Virtual Tour regarding Plastic Waste Management with Municipal Corporation, Surat and aware about waste Collection, Segregation, treatment and Disposal Process. Total 178 Students were participated for the same. • 508 underprivileged students of Fisherman & Maldhari communities from 8 villages taking education at the Adani Vidya Mandir school • Celebration of various days is villages school.
		Rural Infrastructure & Environmental Sustainability	Adani foundation designed and build various structure and provide service in the Health, Education, agriculture and sustainable livelihood area. **WORK COMPLETED** • 31 RRWHS structure have been completed • 45 Bore-well recharging activity is completed. • Development Approach road Prasala vadi vistar Gogan Pachim at Zarpara • Earthen bund Repairing work at Pond, Luni. • Pre-monsoon activity Approach repairing, Village Pond Lake strengthen and river cleaning (babul cutting) work is ongoing in Various Villages • Approach Road repairing at Various Fishermen Vasahat (ARC). **WORK IN PROGRESS** • Construction of common Gathering Rooms at Wandi village. • Development of Chain Link Fencing at tree forestation at Nana Kapaya.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021	
			• Construction of community gathering Shed at Mundra -work in final Stage. **ENVIRONMENT SUSTAINABILITY PROJECTS** • **Miyawaki Forest Development, Nana Kapaya** - Plantation of 4965 saplings of different 42 species is completed which will result in dense forest within 2 years • **Smruti Van** – Plantation more than 40,000 sapling with more than 115 species through Miyawaki methodology. • **Ecosystem Restoration, Guneri** – Grassland ecosystem restoration and mangrove conservation in 40 Ha area over a period of 4 years • **Multi-species Mangrove Park** - Adani Foundation at Mundra 's initiated multi-species plantation of mangroves in Kutch association with GUIDE. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. Current year 3 hector development is planned to extend multi-species mangrove plantation. • **Home biogas** - Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers to Uthhan Villages phase wise. Current year supported 117 home biogas in Dhrub, Zarpara and Navinal Villages. • **Seaweed Culture** - A pilot cultivation facility (5 KL tanks in 6 nos.) for the farming of different economically important seaweeds in the tanks on the onshore has been established and commenced the cultivation trials with red seaweeds Kappaphycus alvarezii, Gracilaria dura and green seaweed Ulva. • **Water Conservation Projects** – ✓ A large number of water harvesting structure (18 Nos. of check dams and Augmentation of 2check dams (1 Check dam current year). ✓ Ground recharge activities (pond deepening work for more than 52 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan ✓ Roof Top Rain Water Harvesting 90 Nos. (35 Nos current year) which is having 10,000 litre storage ✓ Recharge Borewell 125 Nos (50 Nos current year) which is best ever option to. ✓ Drip Irrigation 980 Farmers (56 Application current year) ✓ Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. ✓ Luni Pond Bund Repairing Work.
		Skill Development	Over the last few years, Adani Skill Development Center has assessed various aspects of the technical, leadership and soft skills gaps that organizations, in general, face and accordingly focuses on imparting required training

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		in those areas in partnership with various colleges and institutes. **ASDC, Mundra** • RPL–Recognition of Prior Learning Training given to Adani Group Contractual Employees–Total 218 Employees have been benefitted • Junior Crane Operator practical training to 36 Candidates for (Group-1, 2 & 3) At MICT Port. • Guest Lecture on Mehendi products, Beauty Therapist & Resin art Total 100 candidate have been benefitted. • Certificate Distributed to Mud work candidates at MICT Colony – 30 women learnt Mud work. • Volunteer Support in GKGH and Adani Hospital during covid pandemic. • 21 students were coordinated for interview in seabird CFS of Mundra. **ASDC, Bhuj** • Launched New online General Duty Assistant & Beauty Therapist for 63 candidates under (DDU-GKY). • Soft Skills Training Certificate distribution to Prisoners of Palara Special Jail. • Guest lecture on "Tally: Older vs New" & "Concept of Emerging E-way Bill" **Total Beneficiaries:** • Technical Training: 365 Nos. • Sof-Skill Training: 52 Nos. Please refer **Annexure – 1** for full details of CSR activities carried out by Adani Foundation in the Mundra region. Budget for CSR Activity for the FY 2021-22 is to the tune of INR 1628.45 lakh. Out of which, Approx. INR 423.18 lakh are spent during current compliance period i.e. Apr'21 to Sep'21.
ix	Relocation of the fishermen community if any shall be done strictly in accordance with the norms prescribed by the State Government.	Not Applicable The project was conceptualized in such a way that there are no fishermen settlements in the project proposal. Hence there is no relocation of fishermen communities required.
x	Marine ecology monitoring shall be done regularly during construction of breakwater and dredging /disposal operation.	Complied. Constructions as well as dredging operations are ongoing activities. Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. Summary of the

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same for duration from Apr'21 to Sep'21 is mentioned below.

Total Sampling Locations & frequency: 09 Nos. (Frequency: Once a month)

Parameter	Unit	Surface		Bottom	
		Max	Min	Max	Min
pH	--	8.47	8.02	8.48	7.95
TSS	mg/L	135	88	133	80
BOD (3 Days @27 °C)	mg/L	5.0	2.26	ND*	ND*
DO	mg/L	6.4	5.8	6.0	5.7
Salinity	ppt	37.4	34.86	37.7	35.2
TDS	mg/L	38842	35964	39117	36276

*ND = Not Detectable

Please refer **Annexure – 4** for detailed analysis reports. Approx. INR 9.56 Lakh is spent for all environmental monitoring activities during the compliance period i.e. Apr'21 to Sep'21 for overall APSEZ, Mundra.

Marine monitoring for west port area is being carried out by M/s. Adani Power (Mundra) Limited (Pre-monsoon & Post-monsoon) through NABL accredited and MoEF&CC authorized agency namely M/s. UniStar Environment & Research Labs Pvt. Ltd. Monitoring reports are also enclosed as **Annexure – 4**.

Summary of ecological parameters is given below:
Plankton Diversity: A total of five stations were distributed throughout the sampling effort. Samples were collected during September 2017. A maximum 24 genera of Amphidinium, Amphora, Bacteriastrum, Cerataulina, Ceratium, Chaetoceros, Coscinodiscus, Cylindrotheca, Ditylum, Fragilaria, Gunardia, Hemialus, Lauderia, Melosira, Navicula, Odontella, Pleurosigma, Pseudonitzschia, Rhizosolenia, Scrippsiella, Skeletonema, Surirella, Thalassionema and Thalassiosira identified from station 3 during the period of investigation and a minimum 18 genera of phytoplankton Cerataulina, Chaetoceros, Coscinodiscus, Cylindrotheca, Ditylum, Dinophysis, Fragilaria, Leptocylindrus, Melosira, Meuneria, Navicula, Odontella, Pleurosigma, Protoperidinium,

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		Rhizosolenia, Skeletonema, Thalassionema and Thalassiosira identified from station 2 & 4. The phytoplankton abundance in the study region was ranged from 10000 to 41952 cells L-1. Highest phytoplankton abundance was observed at the ST-3 Surface water. However, lowest phytoplankton abundance was observed at the ST-5 Surface water. The maximum number of groups (24) found at ST-3. **Benthic Diversity:** Benthic invertebrates in the present study area were distributed on the surface of bed forms i.e. sandy and Silty clay in nature. The abundance and diversity, species composition of benthic invertebrates were recorded which is the indicators of changing environmental conditions. A total 5 sub tidal stations and 3 intertidal transect were distributed throughout the sampling effort. Samples were collected during December 2017. Sub tidal: A maximum 4 group of Bivalvia, Polychaeta, Amphipoda, and Sipuncula identified from station 1 & 5 during the period of investigation and a minimum 2 Polychaeta and Amphipoda Benthic fauna recorded from station 2. In the sub tidal region macro benthos abundance was higher at ST-1 (575 no. m-2), whereas lowest abundance was recorded at ST-2 (100 no. m-2). Benthic group count was ranged from 2 to 4, with maximum groups at ST-1&5. High biomass was recorded at ST-5 (8.63mg. m-2) as compared to other stations.
xi	Regular Monitoring of air quality shall be done in the settlement areas around the Project site and appropriate safeguard measures shall be taken.	Complied. Ambient Air Quality and Noise monitoring are being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Pollucon Laboratory Pvt. Ltd. Summary of the same for duration from Apr'21 to Sep'21 is mentioned below. **Air sampling locations & frequency: 11 nos. (twice a week including surrounding villages) & Noise sampling locations & frequency: 8 nos. (once in a month)**

Parameter	Unit	Max	Min	Perm. Limit$
AAQM				
PM_{10}	$\mu g/m^3$	95.62	40.22	100

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$PM_{2.5}$	µg/m³	57.32	15.58	60
SO_2	µg/m³	30.55	6.22	80
NO_2	µg/m³	42.68	13.5	80
Noise	**Unit**	**Leq Max**	**Leq Min**	**Leq Perm. Limit***
Day Time	dB(A)	73.5	48.7	75
Night Time	dB(A)	69.8	51.2	70

$ as per NAAQ standards, 2009
* as per CC&A granted by GPCB
Values recorded confirms to the stipulated standards.

Please refer **Annexure – 4** for detailed analysis reports. Approx. INR 9.56 Lakh is spent for all environmental monitoring activities during the compliance period i.e. Apr'21 to Sep'21 for overall APSEZ, Mundra.

Ambient air quality monitoring in surrounding villages is being carried out by M/s. Adani Power (Mundra) Limited, Mundra through NABL accredited and MoEF&CC authorized agency namely M/s. UniStar Environment & Research Labs Pvt. Ltd. and monitoring reports of the same are also enclosed in **Annexure – 4**.

Following safeguard measures are taken for abatement of dust / fugitive emissions.

- Regular water sprinkling on road and other open area
- Regular cleaning of roads through mechanized equipment
- Dry fog Dust Suppression System (DSS) in hopper, transfer towers and conveyor belts
- Use of water mist canon
- Closed type conveyor belts
- Regular sprinkling on coal heaps with mechanized system
- Covering other types of dry bulk cargo heaps
- Installation of wind breaking wall
- Development of greenbelt along the periphery of the storage yards/back up area
- Mechanized handling system for coal and other dry bulk cargo
- Wagon loading and truck loading through closed silo

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 30-09-2021</th></tr>
<tr><td>xii</td><td>Sewage arising in the Port area shall be disposed off after adequate treatment to conform to the standards stipulated by Gujarat State Pollution Control Board and shall be utilized / recycled for Gardening, Plantation and Irrigation.</td><td>Complied.

Entire quantity of sewage generated is being treated in designated ETP / STP and treated sewage is used for Horticulture purposes.

<table>
<tr><th>Location</th><th>Capacity</th><th>Quantity of Wastewater Treated (Avg. from Apr'21 to Sep'21)</th><th>Type of ETP / STP</th></tr>
<tr><td>LT</td><td>265 KLD</td><td>84 KLD</td><td>Activated Sludge</td></tr>
<tr><td>West Port</td><td>55 KLD</td><td>14.3 KLD</td><td>FAB</td></tr>
</table>

Third party analysis of the treated water is being carried out once in a month at ETP & twice in a month at West Port by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. Summary of the same for duration from Apr'21 to Sep'21 is mentioned below.

<table>
<tr><th>Parameter</th><th>Unit</th><th>Min</th><th>Max</th><th>Perm. Limit$</th></tr>
<tr><td colspan="5">Industrial Effluent / Sewage (For ETP)</td></tr>
<tr><td>pH</td><td>--</td><td>6.58</td><td>7.99</td><td>6.5 – 8.5</td></tr>
<tr><td>TSS</td><td>mg/L</td><td>24</td><td>52</td><td>100</td></tr>
<tr><td>TDS</td><td>mg/L</td><td>793</td><td>2069</td><td>2100</td></tr>
<tr><td>COD</td><td>mg/L</td><td>65</td><td>86</td><td>100</td></tr>
<tr><td>BOD (3 Days @ 27°C)</td><td>mg/L</td><td>12</td><td>19</td><td>30</td></tr>
<tr><td>Ammonical Nitrogen as NH_3-N</td><td>mg/L</td><td>1.76</td><td>8.56</td><td>50</td></tr>
<tr><td colspan="5">Domestic Sewage (For STP)</td></tr>
<tr><td>pH</td><td>--</td><td>6.90</td><td>7.94</td><td>6.5 – 9.0</td></tr>
<tr><td>TSS</td><td>mg/L</td><td>12</td><td>16</td><td>100</td></tr>
<tr><td>BOD (3 Days @ 27 °C)</td><td>mg/L</td><td>10</td><td>19</td><td>30</td></tr>
<tr><td>Residual Chlorine</td><td>ppm</td><td>0.5</td><td>0.8</td><td>--</td></tr>
<tr><td>Fecal Coliform</td><td>Nos.</td><td>240</td><td>540</td><td><1000</td></tr>
</table>
$ as per CC&A granted by GPCB
Values recorded confirms to the stipulated standards.</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
		Please refer **Annexure – 4** for detailed analysis reports. Approx. INR 9.56 Lakh is spent for all environmental monitoring activities during the compliance period i.e. Apr'21 to Sep'21 for overall APSEZ, Mundra. It is also noted that GPCB is doing regular site inspection along with wastewater sampling and analysis. The last GPCB sample analysis reports is attached as **Annexure – 5**, which shows all the parameters are well within the permissible limit.
xiii	Adequate Plantation shall be carried out along the roads of the Port premises and a green belt shall be developed.	Complied. APSEZ has developed its own "Dept. of Horticulture" which is taking measures/ steps for terrestrial greening as well as mangrove plantation. The species such as *Ficus Infectoria, Ficus religiosa, Terminalia arjuna, Cocos nucifera, Washingtonia fillifera, Casurina spp., Azadirachta Indica, Eucalyptus spp., Jatropha curacus, Ficus bengalensis, Subabool spp., Casia fistula, Date Palm* and *Delonix regia* are grown within APSEZ area. Within the port areas approx. 182 hectare of greenbelt having 4,77,342 trees with the density of 2620 trees per hectare is developed till date within port premises. So, far APSEZ has developed 486.19 ha. area as greenbelt with plantation of more than 9.4 Lacs saplings within the APSEZ area. Please refer **Annexure – 3** for further details regarding greenbelt development, mangrove afforestation and updated green belt development plan. Total expenditures of the horticulture dept. for the financial year of 2021-22 (Till Sep'21) have been INR 605 lakhs.
xiv	There shall be no withdrawal of Ground Water in CRZ area for this Project.	Complied. APSEZ does not draw any ground water for the water requirement. Present source of water for various project activities is desalination plant of APSEZ and/or water through Gujarat Water Infrastructure Limited. Average

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
		water consumption for entire APSEZ area is 3.93 MLD during the compliance period Apr'21 to Sep'21.
xv	Specific arrangements for rain water harvesting shall be made in the Project design and the rain water so harvested shall be optimally utilized. Details in this regard shall be furnished to this Ministry's Regional Office at Bhopal within 3 months.	Complied. Groundwater recharge cannot be done at the project site since the entire project is in the intertidal / sub tidal areas. Rainwater within project area is managed through storm water drainage. We have installed Rainwater recharge bore well (4 Nos.) within our township to recharge ground water. Details of the same were submitted along with half yearly EC compliance report for the period Apr'19 to Sep'19. During last monsoon Approx. 530 KL of rainwater has been recharged to increase the ground water table. We have also connected roof top rainwater duct of operational building (Tug berth building within MPT) with u/g water tank for utilization of collected rain water for gardening / horticulture purpose. Details of the same were submitted along with EC Compliance report for the period Oct'18 to Mar'19. However, Adani Foundation – CSR arm of Adani Group has carried out rainwater harvesting activities in the nearby villages for benefit of the locals. Water conservation Projects i.e. Roof Top Rain Water Harvesting, Desilting of Check dams, Bore Well Recharge and Pond deepening were taken up in past years, review and monitoring of all water harvesting structures had been taken up. To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, this year Adani Foundation launch project "Sanrakshan" in coordination with GUIDE and Sahjeevan. Since 10 years considerable Water Conservation Work carried out in Mundra Taluka. Due to satisfactory rain in current year 1.11 mtr ground water table increased as per

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
		increased in coastal belt of Mundra as per Government Figures. **Our water conservation work is as below.** • A large number of water harvesting structure (18 Nos. of check dams incoordination with salinity department) and Augmentation of 2check dams (1 Check dam current year). • Ground recharge activities (pond deepening work for more than 52 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers. • Roof Top Rain Water Harvesting 90 Nos. (35 Nos current year) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. • Recharge Borewell 125 Nos (50 Nos current year) which is best ever option to. • Drip Irrigation 980 Farmers (56 Application current year) benefitted in coordination with Gujrat Green Revolution Company. • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. • Luni Pond Bund Repairing Work is completed. With the objective of to preserve the rainwater to reduce the impact of salinity and recharge the ground water (the main source of water) to facilitate the Agricultural activities as well as for drinking water. Please refer **Annexure – 1** for full details of CSR activities carried out by Adani Foundation in the Kutch region.
xvi	Land Reclamation shall be carried out only to the extent that it is essential for this Project.	Complied. Out of approved reclamation area of 1138 ha for west port, 695 ha area is reclaimed and out of approved reclamation area of 700 ha for south port, 665 ha area is reclaimed. Details of the same were submitted along with last compliance report submission for the period Apr'17 to Sep'17 and there is no further change.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
xvii	No Product other than those permissible in the Coastal Regulation Zone Notification, 1991 shall be stored in the Coastal Regulation Zone area.	Complied. No products other than those permissible in the CRZ Notification 1991 are stored in the CRZ area.
General Conditions		
i	Construction of Proposed structures, if any in the Coastal Regulation Zone area shall be undertaken meticulously confirming to the existing Central/local rules and regulations including Coastal Regulation Zone Notification 1991 and its amendments. All the construction designs/ drawings relating to the proposed construction activities must have approvals of the concerned State Government Departments/ Agencies.	Complied. All construction activities are carried out confirming to the existing rules and regulation and as per the CRZ notification. Further, the requisite permissions from Gujarat Maritime Board (GMB), for carrying out construction activities are taken from time to time. Details of the same are mentioned below: • Permission for starting construction work for South port vide letter no GMB/N/PVT/711/870 dated 26.02.2009 • Permission for starting construction work for West port vide letter no GMB/N/PVT/711/871 dated 26.02.2009 The copies of these letters were submitted as part of the compliance report submission for the period Apr'16 to Sep'16. The project has been developed as per Consent to Establish (CtE) and Consent to Operate (CtO) granted by SPCB. The present in-force CtE & CtO are mentioned below.

S. No.	Permission	Project	Ref. No. / Order No.	Valid till
1	CtO – Renewal	Mundra Port Terminal	AWH-83561	20.11.21
2	CtE – Fresh	LPG Terminal	CTE – 88079	04.07.22
3	CtE – Amendment	LPG Terminal	PC/CCA-KUTCH-1437/GPCB ID: 53331/468197	04.07.22
4	CtO - Amendment	Mundra Port Terminal	GPCB/CCA-Kutch -39(5)/ ID-	20.11.21

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
		<table><tr><td></td><td></td><td></td><td>17739/473575</td><td></td></tr><tr><td>5</td><td>CtE – Amendment</td><td>LPG Terminal</td><td>PC/CCA-KUTCH-1437/PCB ID-53331/473995</td><td>03.10.25</td></tr><tr><td>7</td><td>CtO - Amendment</td><td>Mundra Port Terminal</td><td>H-98086</td><td>20.11.21</td></tr><tr><td>8</td><td>CtO - Amendment</td><td>Mundra Port Terminal</td><td>H-105708</td><td>20.11.21</td></tr><tr><td>9</td><td>CtE – Amendment</td><td>WFDP</td><td>17739 / 15618</td><td>18.05.27</td></tr><tr><td>10</td><td>CtO - Fresh</td><td>LPG Terminal</td><td>AWH-103906</td><td>27.06.24</td></tr><tr><td>11</td><td>CtE – Amendment</td><td>LPG Terminal</td><td>PC/CCA-KUTCH-1437/GPCB ID-53331/587015</td><td>01.03.26</td></tr><tr><td>12</td><td>CC&A - Amendment</td><td>LPG Terminal</td><td>PC/CCA-KUTCH-1437/GPCB ID-53331/595228</td><td>27.06.24</td></tr><tr><td>13</td><td>CC&A - Renewal</td><td>West Port – WFDP</td><td>AWH-113458</td><td>01.02.27</td></tr><tr><td>14</td><td>CtO - Correction</td><td>Mundra Port Terminal</td><td>PC/CCA-KUTCH-39(7)/GPCB ID 17739/592900</td><td>20.11.2021</td></tr></table> The permissions mentioned above (Sr. 1 to 11) were submitted along with earlier compliance report submission. The updated permission copies (Sr. No. 12 to 14) are attached as **Annexure – 6**. APSEZ has already applied for CC&A Renewal for Mundra Port Terminal to the GPCB vide Inward No. 202362, dated 25.08.2021, which is under scrutiny. Details of the same are attached as **Annexure – 7**.
ii	Adequate provision for infrastructure facilities such as water supply, fuel, sanitation etc. shall be ensured for construction workers during the construction phase of the project so as to avoid felling of trees/mangroves and pollution of water and the surroundings.	Not applicable Most of the construction labours reside in the nearby villages where all basic facilities are easily available. There are no housing requirements for labours inside the project area.

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iii	The project authorities must make necessary arrangements for disposal of solid wastes and for the treatment of effluents by providing a proper wastewater treatment plant outside the CRZ area. The quality of treated effluents, solid waste, and noise level etc. must conform to the standards laid down by the competent authorities including the Central/ State Pollution Control Board and the Union Ministry of Environment and Forests under the Environment (Protection) Act, 1986, whichever are more stringent.	Complied. Monitoring of environmental attributes viz. Air, Water, Noise, Soil, etc. is being carried out on regular basis by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. Approx. INR 9.56 Lakh is spent for all environmental monitoring activities during the FY 2021-22 (Till Sep'21) for overall APSEZ. Please refer Specific Conditions no. x, xi & xii for further details regarding environmental monitoring. **Liquid Effluent & Sewage** – It is being treated at decentralized treatment plants and treated water confirming the stipulated norms is being utilized for horticulture purposes within APSEZ. Please refer specific condition no xii above for details regarding the same. **Waste Management** – APSEZ has adopted 5R concept for environmentally sound management of different types of solid & liquid wastes. Please refer below details about management of each type of waste. **Solid Waste**: A well-established system for segregation of dry & wet waste is in place. All wet waste (Organic waste) is being segregated & utilized for compost manufacturing and/or biogas generation for cooking purpose. The compost is further used by in house horticulture team for greenbelt development. Whereas dry recyclable waste is being sorted in various categories. Presently manual/mechanical sorting is being done for sorting of different types of solid waste. Segregated recyclable materials such as Paper, Plastic, Cardboard, PET Bottles, and Glasses, etc. are then sent to respective recycling units, whereas remaining non-recyclable waste is bailed and sent to cement plant (M/s. Ambuja Cement Ltd., Kodinar) for Co-processing as RDF (Refused Derived Fuel). APSEZ, Mundra is certified for Zero Waste to Landfill management system (ZWTL MS 2020) by TUVRheinland India Pvt. Ltd. (valid up to 31.05.2024). APSEZ, Mundra has also been certified as Single Use Plastic (SUP) Free

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
		Port by Confederation of Indian Industry (CII) (valid up to 25.05.2022). Details of the same are attached as **Annexure – 8**. **Hazardous & Other Waste:** • Bio medical waste generated from OHCs and Adani Hospital is being disposed at Common Bio Medical Waste Treatment Facility namely M/s. Distromed Kutch Services Pvt. Ltd., Bhuj. • E – Waste & Used Batteries are being sold to GPCB registered recyclers namely M/s. Galaxy Recycling, Rajkot and Sabnam Enterprise, Kutch respectively. • Solid Hazardous Waste is being disposed through co-processing / incineration through common facility i.e. M/s. Saurashtra Enviro Projects Pvt. Ltd., Bhachau and/or cement industries of Ambuja Cement Ltd., Kodinar. Used/Waste Oil is being sold to GPCB authorized recyclers / re-processors namely M/s. Aroma Petrochem, Bhavnagar & Aviation Corporation, Kutch. It is also being reused within organization for lubrication purpose. • Discarded drums / barrels are being sold to authorized decontamination facility i.e. M/s. Jawrawala Petroleum, Ahmedabad. It is also being reused within organization for filling hazardous waste. • Solid hazardous waste i.e. Tank bottom sludge is being sold to authorized recycler namely M/s. Mundra Oil Pvt. Ltd., Mundra for recycling. • Expired paint materials is being disposed by incineration through common facility i.e. M/s. Saurashtra Enviro Projects Pvt. Ltd., Bhachau. • Downgrade chemicals generated from cleaning of storage tanks / pipelines are being sold to authorized solvent recovery facilities namely M/s. Acquire Chemicals, Ankleshwar however during the compliance period, there was no disposal of downgrade chemicals. • Slop Oil received from vessels is treated to separate water and oil particles in Oil Water Separator system. Separated oil from the same is being sold to authorized recycler / reprocessor namely M/s. Aroma Petrochem, Bhavnagar & Aviation Corporation, Kutch and water is

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 30-09-2021</th></tr>
<tr><td></td><td></td><td>sent to ETP for further treatment. However during the compliance period, there was no received or disposal of Slope Oil.

Details of permissions / agreements of hazardous waste authorized vendors were submitted along with pervious half yearly EC Compliance Reports. And there is no further change.

The following table summarizes the waste management practice (from Apr'21 to Sep'21) for different types of wastes at APSEZ:
<table>
<tr><th>Type of Waste</th><th>Quantity in MT</th><th>Disposal method</th></tr>
<tr><td colspan="3">Hazardous Waste</td></tr>
<tr><td>Pig Waste</td><td>9.01</td><td rowspan="2">Co-processing at cement industries</td></tr>
<tr><td>Oily Cotton waste</td><td>68.5</td></tr>
<tr><td>Used / Spent Oil</td><td>223.6</td><td>Sell to registered recycler</td></tr>
<tr><td rowspan="2">Discarded Containers / Barrels</td><td>29.56</td><td>Sell to registered recycler</td></tr>
<tr><td>1.49</td><td>Reuse within premises</td></tr>
<tr><td colspan="3">Other Waste</td></tr>
<tr><td>Battery Waste</td><td>30.0</td><td>Sell to registered recycler</td></tr>
<tr><td>E-Waste</td><td>35.79</td><td>Sell to registered recycler</td></tr>
<tr><td>Bio Medical Waste</td><td>3.0</td><td>To approved CBWTF Site</td></tr>
<tr><td colspan="3">Non-Hazardous Waste</td></tr>
<tr><td>Recyclables Dry Waste / Scrap</td><td>755.97</td><td>After recovery sent for recycling / Reuse within premises</td></tr>
<tr><td>Non-Recyclable Dry Waste (RDF)</td><td>217.86</td><td>Co-processing at Cement Industries</td></tr>
<tr><td>Wet Waste (Food waste + Organic waste)</td><td>438.55</td><td>Converted to Manure for Horticulture use / Biogas for cooking purpose</td></tr>
<tr><td>STP Sludge</td><td>17</td><td>Used as a Manure for horticulture purpose</td></tr>
</table></td></tr>
<tr><td>iv</td><td>The Proponent shall obtain the requisite consents for discharge of effluents and emissions under the Water (Prevention and Control of pollution) Act, 1974 and the Air (Prevention and Control of pollution) Act, 1981 from the Gujarat Pollution Control Board before</td><td>Complied.

All construction activities were carried out confirming to the existing rules and regulation and as per the CRZ notification.

Please refer General condition no. i for permission granted from state pollution control board regarding the same.</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
	commissioning of the Project and copy of each of these shall be sent to this Ministry.	
v	The sand dunes, corals, and mangroves, if any, on the site shall not be disturbed in any way.	Complied There are no sand dunes and corals at the project site. 1254 ha area identified as potential mangrove conservation is being conserved and there is no disturbance to the mangroves in this area. Please refer specific condition no i above for details regarding the same.
vi	A copy of the clearance letter will be marked to the concerned Panchayat / Local NGO, if any from whom any suggestions /representations has been received while processing the proposal.	Complied. Copy of the clearance letter was marked to the concerned panchayats. A typical proof of the same submitted to Mundra village Panchayat on 21.03.2009 was submitted as a part of compliance report submission for the period Apr'16 to Sep'16.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
vii	The funds earmarked for environment protection measures shall be maintained in a separate account and there shall be no diversion of these funds for any other purpose. A year wise expenditure on environmental safeguards shall be reported to this Ministry's Regional Office at Bhopal and the State Pollution Control Board.	Complied. Separate budget for the Environment protection measures is earmarked every year. All environment and horticulture activities are considered at corporate level and budget allocation is done accordingly. All the expenses are recorded in advanced accounting system of the organization. Budget for environmental management measures (including horticulture) for the FY 2021-22 is to the tune of INR 1332 lakh. Out of which, Approx. INR 876 lakh are spent during the year 2021-22 (till Sep'21). Detailed breakup of the expenditures for the past 3 years is attached as **Annexure – 9**. Details regarding the past six compliance report submissions are mentioned below: **Sr. no. / Compliance period / Date of submission** 1 / Apr'18 to Sep'18 / 30.11.2018 2 / Oct'18 to Mar'19 / 31.05.2019 3 / Apr'19 to Sep'19 / 28.11.2019 4 / Oct'19 to Mar'20 / 20.05.2020 5 / Apr'20 to Sep'20 / 26.11.2020 6 / Oct'20 to Mar'21 / 25.05.2021
viii	Full support shall be extended to the Officers of this Ministry's Regional Office at Bhopal and the Officers of the Central and State Pollution Control Boards by the Project Proponents during their inspection for monitoring purposes, by furnishing full details and action plans including the action taken reports in respect of mitigative measures and other environmental Protection activities.	Complied APSEZ is always extending full support to the regulatory authorities during their visit to the project site. All necessary documents are submitted as per the request of the visiting authorities. Last visit of Regional Office, GPCB was done on 09.04.2021 for West Port and 23.09.2021 for Main port. APSEZL has submitted the reply to the site visit report vide letter dated 12.04.2021 & 28.09.2021 incorporating details of action taken in respect of the observations of the GPCB representative. Details of the same are attached as **Annexure – 10**. Inline to the compliance certification process of Environment Clearance condition of Waterfront

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
		Development Plan, RO, MoEF&CC Bhopal had visited the site on 27th & 28th January, 2020 for compliance verification. APSEZ provided all requisite information and documents required by the Regional Officer MoEF&CC). During the said compliance verification visit and as per the compliance certification received, there was no major non-compliance observed. Inline to the compliance certification process of Consent to Operates of existing facilities developed under Waterfront Development Plan, RO, GPCB, Gandhidham had visited the site on 17th March, 2021 for compliance verification. APSEZ provided all requisite information and documents required by the Regional Officer GPCB). During the said compliance verification visit and as per the compliance certification received, there was no non-compliance observed. Inline to the compliance of MoEF&CC Order dated 18th September, 2015, Joint Review Committee (JRC) comprising officials from various competent authorities visited the APSEZ, Mundra from 1st to 3rd September, 2021 to monitor the progress of implementation of the conditions stipulated in the order. APSEZ provided all requisite information and documents required by the JRC.
ix	In case of deviation or alteration in the Project including the implementing agency, a fresh reference shall be made to this Ministry for modification in the clearance conditions or imposition of new ones for ensuring environmental protection.	Complied. LNG terminal was initially approved under the Waterfront Development Project. However the same has been developed by GSPC LNG Ltd. for which, separate EC and CRZ clearance has already been obtained from MoEF&CC by them. Copy of the same was submitted along with compliance report submission for the period Oct'16 to Mar'17. LPG terminal was initially approved under the Waterfront Development Project of Adani Ports and SEZ Limited and the same has been developed by M/s. Mundra LPG Terminal Pvt. Ltd., which is 100% subsidiary of APSEZ. Details of the same were submitted along with half yearly compliance report for the period Oct'17 to Mar'18.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
x	The Ministry reserves the right to revoke this clearance, if any of the conditions stipulated are not complied with to the satisfaction of this Ministry.	Point noted and agreed.
xi	This Ministry or any other competent authority may stipulate any other additional conditions subsequently, if deemed necessary, for environmental protection which shall be complied with.	Complied As part of the directions given by MoEF&CC vide order dated 18th Sep, 2015, following studies were proposed. • Bathymetry & Topography study, preparation of plan for protection of creeks/ mangrove area including buffer zone, mapping of co-ordinates, running length, HTL, CRZ boundary. • A Regional Impact Assessment study to identify impacts of all the existing as well as proposed project activities in Mundra region. Please refer **Annexure – B** for further details regarding the mentioned studies.
xii	The project proponent shall advertise at least in two local newspapers widely circulated in the region around the Project, one of which shall be in the vernacular language of the locality concerned informing that the Project has been accorded Environmental Clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen at the website of the Ministry of Environment & Forest at http://www.envfornic.in. The advertisement shall be made within 7 days from	Complied. The original copy of the EC and CRZ clearance was obtained on 10.03.2009 and advertisement (containing informing that the EC and CRZ clearance is accorded to the proposed project and a copy of clearance letter is available with the SPCB and may also be seen at the website of MoEF&CC) was given in The Indian Express newspaper dated 18.03.2009. Copy of the same was submitted along with compliance report submission for the period Apr'16 to Sep'16.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
	the date of issue of the clearance letter and a copy of the same shall be forwarded to the Regional Office of this Ministry at Bhopal.	
xiii	The Project proponent shall inform the Regional Office at Bhopal as well as the Ministry the date of financial closure and final approval of the Project by the concerned authorities and the date of start of land development work.	Complied. APSEZ had informed the Regional Office of MoEF&CC at Bhopal as well as MoEF&CC, New Delhi regarding the date of financial closure and the date of start of land development work vide letter sent in August, 2009.
xiv	Any appeal against this environmental clearance shall lie with the National Environment Appellate Authority, if preferred, within period of 30 days as prescribed under section 11 of the National Environment Appellate Act, 1997.	Point noted and agreed. This EC and CRZ clearance was challenged in National Environment Appellate Authority. In this matter, Order has also been passed in favour of APSEZ. Copy of the same was submitted along with compliance report submission for the period Oct'16 to Mar'17.
4.	The above mentioned stipulations will be enforced among others under the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981, the Environment (Protection) Act 1986, the Hazardous chemicals (Manufacture, Storage & Import) Rules 1989, the Coastal Regulation Zone Notification 1991 and its subsequent amendments and the Public Liability	Point noted and Agreed APSEZ is being complied all the conditions said rules and regulations mentioned in EC point no. 4. APSEZ has valid insurance policy under PLI act 1991 as below. 1. APSEZ – Liquid Terminal: Valid till 31.03.2022 2. Mundra LPG Terminal Pvt. Ltd.: Valid till 12.10.2022 Copy of APSEZ (LT) PLI Policy was submitted along with last half yearly EC compliance report for the period Oct'20 to Mar'21. Valid PLI Policy of MLTPL is attached as **Annexure – 11**.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2021
	Insurance Act 1991 and the rules made there under from time to time. The project proponent shall ensure that the proposal complies with the provisions of the approved Coastal Zone Management Plan of Gujarat state and the supreme court's order dated 18 April, 1996 in the writ petition No. 664 of 1993 to the extent the same are applicable to this proposal.	

ANNEXURE – A

CRZ Recommendation Compliance Report of WFDP

Compliance Status of CRZ Recommendation given by GCZMA for the Waterfront Development Project

Sr. No.	Specific Conditions	Compliance Status as on 30-09-2021
Specific Conditions		
1	The provisions of the CRZ notification of 1991 and subsequent amendments issued from time to time shall be strictly adhered to by the MPSEZL. No activity in contradiction to the provisions of the CRZ Notification shall be carried out by the MPSEZL.	Complied. All construction and operation activities are being carried out in line with the CRZ recommendation and permissions granted.
2	All necessary permissions from different Government Departments/ agencies shall be obtained by the MPSEZL before commencing any activities.	Complied. Necessary permissions from competent authority have been obtained before commencing any the activities. Please refer condition no. i & iv of General Conditions of the EC & CRZ Clearance above.
3	All major creeks shall be protected and no reclamation shall be done in these creeks and entire development along the creek shall be done after carrying out detailed engineering with an objective of environmental protection including protection of all major creeks to ensure adequate free flow of water and drainage of rain water during rainy seasons.	Complied. All major creeks within the APSEZ area are protected. Please refer specific condition no iii of the EC and CRZ clearance for details regarding this point.
4	The project proponent shall conserve the 1254 ha. of area as committed and proposed in their master plan and shall carry out plantation of various mangrove species in the said area.	Complied. Mangrove conservation area of 1254 Ha is conserved as proposed in the master plan. Please refer specific condition no i of the EC and CRZ clearance for details regarding this point.
5	Massive mangroves plantation activity in at least 300 ha. area shall be carried out within a time frame	Complied. Mangrove plantation is already completed during the

Sr. No.	Specific Conditions	Compliance Status as on 30-09-2021
	of 5 years as committed by the project proponent. This would be in addition to the earlier commitment for 1200 ha. of mangroves plantation.	year 2012-13. Please refer specific condition no. vii of the EC and CRZ clearance for further details.
6	All major creeks shall be protected and no reclamation shall be done in these creeks and entire development along the creek shall be done after carrying out detailed engineering with an objective of environmental protection including protection of all major creeks to ensure adequate free flow of water and drainage of rain water during rainy seasons.	Complied. No effluent or sewage is discharged in to the CRZ area. Please refer specific condition no xii of the EC and CRZ clearance for details regarding this point.
7	All the recommendations and suggestions given by NIO in their Environment Impact Assessment report for conservation / protection and betterment of environment shall be implemented strictly by MPSEZL.	Complied. Compliance report of environmental management plan and mitigation measures proposed as part of the EIA report is attached as **Annexure – 12**.
8	The construction and operational activities as well as dredging and reclamation activities shall be carried out in such a way that there is no negative impact on mangroves and other coastal /marine habitat except the proposed approx. 63 ha of area for which the compensation (300 ha.) is proposed.	Complied. All construction and operation activities as well as dredging and reclamation activities are being carried out as per the approvals. 1254 ha area identified as mangrove conservation area is being conserved by APSEZ. Please refer specific condition no i of the EC and CRZ clearance for details regarding this point.
9	The construction activities and dredging shall be carried out under the supervision/monitoring of the NIO or any such institute of repute.	Complied. Construction activities are carried out as per EIA study carried out by NIO with all mitigative measures as suggested. Requisite permissions are taken from competent authorities such as GMB and GPCB. Site visits are being carried out by govt. officers from time to time to ensure compliance of the conditions

Sr. No.	Specific Conditions	Compliance Status as on 30-09-2021
		stipulated in respective permissions. No capital dredging activities are carried out during the Oct'20 to Mar'21 period. Please refer condition no. i, iv & viii of General Conditions of the EC & CRZ Clearance above.
10	The dredge material generated during capital dredging shall be used only for reclamation and that to be generated during maintenance dredging shall be disposed of at the place identified by NIO/CWPRS/WAPCOS through appropriate modeling and it shall be ensured that it does not create any negative impacts.	Complied. Entire quantity of dredged material is used for reclamation activities only; no disposal is carried out in the sea. No capital dredging activities are carried out during the Apr'21 to Sep'21 period.
11	Necessary measures including the shore protection activities shall be undertaken to ensure that there are no erosion in surrounding area due to the proposed activities.	Complied. All dredging and reclamation activities are carried out as per EC and CRZ Clearance and no erosion is observed. For further details regarding the shoreline change study for the Mundra region, please refer specific condition no v of the EC and CRZ clearance.
12	The alignment of the jetties/berths and other structures shall be done after conducting the detailed modeling to ensure that there are no erosion and accretion in the region due to proposed activities.	Complied. Detailed hydrodynamic modeling was carried out by NIO during preparation of the EIA report. All construction activities are being carried out as per the outcome/recommendations of the modeling report. However, a detailed shoreline change assessment study is also carried out. Please refer specific condition no v of the EC and CRZ clearance for further details.
13	The MPSEZL shall contribute financially for any common study or project that may be proposed by this department for environment management / conservation /	Complied. There are two studies prescribed by MoEF&CC. For further details regarding the same, please refer general condition no xi of the EC and CRZ clearance.

Sr. No.	Specific Conditions	Compliance Status as on 30-09-2021
	improvement for the Gulf of Kutchh.	
14	The construction debris and /or any other type of waste shall not be disposed of into the sea, creek or in the CRZ areas. The construction is over and shall be disposed off in low lying areas in consultation with NIO, NEERI or any such institute of repute.	Complied. All construction and operation activities as well as dredging and reclamation activities are being carried out as per the EIA report prepared by NIO. The construction debris, if any, is being used for area development outside CRZ area. For details about management of other types of wastes, please refer general condition no. iii of the EC and CRZ clearance.
15	The construction camps shall be located outside the CRZ area and the construction labour shall be provided with the necessary amenities, including sanitation, water supply and fuel and it shall be ensured that the environmental conditions are not deteriorated by the construction labors.	Compiled. Please refer general condition no ii of the EC and CRZ clearance for further details.
16	The MPSEZL shall regularly update their Local Oil Spill Contingency and Disaster Management Plan in consonance with the National Oil Spill and Disaster Contingency Plan and shall submit the same to this Department after having it vetted through the Indian Coast Guard.	Compiled. Disaster Management Plan is updated regularly and the updated DMP was submitted as a part of compliance report for the period Apr'16 to Sep'16. On Site Emergency Response Plan and Crisis Management Plan is in place and implemented. The updated Onsite emergency plan is attached as **Annexure – 13**. Oil spill contingency plan is in place to handle Tier 1 level oil spills considering different accident scenarios, and the vulnerable areas are identified and mitigation plan is prepared. Oil spill contingency response plan is being updated on regular basis and the same was last updated on 01.10.2021 is in place and implemented. Details were submitted along with last half yearly EC compliance report for the period Oct'20 to Mar'21. And there is no further change.

Sr. No.	Specific Conditions	Compliance Status as on 30-09-2021
		For responding to oil spill, the Indian Coast Guard has developed the National Oil Spill Disaster Contingency Plan NOSDCP which has the approval of the Committee of Secretaries and has been in operation since 1996. Oil Spill Contingency Response Plan (OSCRP) is prepared in accordance with the NOSDCP. Regional Level Pollution Response exercise **"SWACHCHH SAMUDRA-NW 2019"** was carried out by Indian Coast Guard on 18th Dec, 2019. All participants from various Oil Handling Agencies and Stakeholders (ICG, GMB Port, DPT Vadinar, IOCL, RIL, NAYARA Energy, BORL, ESBTL Salaya, APSEZL, HMEL, GSFC, PCB, Forest Dept., Customs, Fisheries & DPT Kandla) were participated in this exercise.
17	The MPSEZL shall participate and contribute for the Vessel Traffic Management System to be developed for the Gulf of Kutchh being developed.	Complied. A VTMS service for Gulf of Kutch is operated by Directorate General of Lighthouses and Lightships (DGLL), Govt. of India. APSEZ is practicing well defined traffic control procedure. Marine Control of APSEZ provides traffic update to vessels in Mundra Port Limit on VHF Channel- 77. Arrival and departure information in Gulf of Kutch is provided to VTMS information cell through an agent or directly by sending an e-mail to vtsmanagergulfofkutch @ yahoo.com and vtsgok@yahoo.com. Mundra port has subscribed and taking VTMS feed from Kandla from link www.vts.gov.in.
18	The MPSEZL shall bear the cost of external agency that may be appointed by this Department for supervision/monitoring of proposed activities and the environmental impacts of the proposed activities.	Complied. There are two studies prescribed by MoEF&CC. For further details regarding the same, please refer general condition no xi of the EC and CRZ clearance.

Annexure – B Compliance Status of MoEF & CC Order dated 18.09.2015

Based on the report submitted by Sunita Narain committee, MoEF&CC issued a Show Cause Notice (SCN) to APSEZ vide their letter dated 30.09.2013. APSEZ replied to the SCN vide letter dated 14.10.2013. Further, an order (containing 10 directions) was issued by MoEF&CC vide their letter dated 18.09.2015. Compliance to these 10 directions is mentioned below.

Sr. No.	Condition	Compliance Status as on 30-09-2021
i	The proposal of extension of the validity of environmental clearance granted to the North Port vide letter dated 12.01.2009 will be considered separately at later stage.	Point Noted & Complied After receipt of this order, so far APSEZ has not done any application to MoEF&CC for the proposed North port. The expansion of Waterfront Development plan has been proposed excluding North Port area.
ii	Bocha island, ecologically sensitive geomorphological features and areas in the island and creeks around the island will be declared as conservation zone action plan for its conservation must be prepared. M/s. APSEZ should provide necessary financial assistance for this purpose.	Complied This reply covers condition no ii, iv and v. Based on the MoEF&CC directions, 1. APSEZ, vide letter dtd. 19th October 2015 had requested GCZMA, for consideration of project for finalization of ToR for NCSCM. 2. Project was considered on 28th GCZMA meeting, scheduled on 22nd April 2016, where ToR was discussed and agreed, upon. 3. APSEZ, vide its letter dtd. 25th April 2016, submitted the proposal to GCZMA along with Scope of work, as submitted by NCSCM. 4. Service Order was issued to NCSCM vide SO dtd. 29th Aug 2016. Cost of the study as per the NCSCM proposal was 315 Lakh and 100% of payment has already paid to NCSCM. 5. NCSCM has carried out number of site surveys during the period, February 2017 – April 2018 as per the defined scope 6. The study report was submitted to GCZMA (with a copy to MoEF&CC vide letter dated 04.06.2018) for their consideration and recommendation if any. 7. A reminder letter was submitted to GCZMA vide letter dated 4th Jan 2019. Details of above chronology were submitted along with half yearly compliance report for the period Apr'19 to Sep'19. The site survey carried out by NCSCM includes: 1. Bathymetry survey of creeks 2. Topography survey of intertidal areas
iv	A comprehensive and integrated study and protection of creeks/ mangrove area including buffer zone, mapping of co-ordinates, running length, HTL, CRZ boundary, will be put in place. The plan will take note of all the conditions of approvals granted to all the project proponents in this area e.g. the reported case of disappearance of mangroves near navinal creek. The preservation of entire area to maintain the fragile ecological condition will be a part of the plan in relation to the creeks, mangrove conservation and conservation of bocha island up to baradimata and others.	
v	NCSCM will prepare the plan in consultation with NIOT, PP and GCZMA. In recognition of the fact that the existing legal	

Sr. No.	Condition	Compliance Status as on 30-09-2021
	provisions under the E(P) Act 1986 do not provide for any authority to impose ERF by the government, the plan will be financed by the PP. the implementation will be carried out by GCZMA. The monitoring of the implementation will be carried by NCSCM.	3. Mangrove survey (health and area demarcation) 4. Sampling of soil and water for analysis of physico-chemical and biological parameters 5. Tide and currents data collection (including residence time of tidal water) 6. Focus Group Discussions with the community in the close vicinity of the project area In addition to the site surveys, NCSCM has procured satellite images for analysis of mangrove cover. The data collected (through site surveys and analysis of satellite maps) was used as input for mathematical modelling. The modelling studies were carried out to understand the impacts of the development activities. Based on the outcome of the modelling studies the necessary conservation plan for protection of creeks and mangrove areas is prepared. Based on the final study report, outcome is summarized in to following points : 1. There is no obstruction to any water stream (creeks / branches of creeks / rivers) 2. Presently, mangrove cover in and around APSEZ was over 2340 ha. There was substantial growth in mangrove cover to the tune of 246 ha (comparison between 2011 and 2016-17) 3. Mundra has undergone substantial development during this tenure. Hence it can be interpreted that the infrastructure development has not left any adverse impacts on ecology. NCSCM study same was submitted to the GCZMA on 04.06.2018. Details of the same were submitted along with half yearly EC Compliance report for the period Apr'19 to Sep'19. The same was further submitted to GCZMA and MoEF&CC for their examination and recommendation vide (with a copy to MoEF&CC vide letter dated 04.06.2018 & reminder letter vide dated 4th Jan, 2019). Presentation on the findings of the report was made to GCZMA committee on 4th October 2019 and the recommendation for the same has been received vide

<table>
<tr><th>Sr. No.</th><th>Condition</th><th>Compliance Status as on 30-09-2021</th></tr>
<tr><td></td><td></td><td>email dtd 22nd Sept, 2020 with conditions. Details of the same were submitted as a part of last half yearly EC compliance report for the period Oct'20 to Mar'21.

As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.

<table>
<tr><th>Sr. No.</th><th>Recommendations</th><th>Compliance</th></tr>
<tr><td>1.</td><td>Mangrove mapping and monitoring in and around APSEZ</td><td>• APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island.
• As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 & 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.7%.
• This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion of scattered to sparse which also shows that the growth of mangroves in a progressive direction.
• Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019.
• The cost of the said study was INR 23.56 Lacs incurred by APSEZ.</td></tr>
<tr><td>2.</td><td>Tidal observation in creeks in and around APSEZ</td><td>• APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM.</td></tr>
</table>
</td></tr>
</table>

Sr. No.	Condition	Compliance Status as on 30-09-2021		
				• The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves. • The cost of the said activity was INR 1.0 Lacs.
		3.	Removal of Algal and Prosopis growth from mangrove areas	• Algal and Prosopis growth monitoring was done in and around mangrove area and algal encrustation was found in some of the mangrove areas, which has been removed manually. • The cost of the said activity was INR 1.2 Lacs.
		4.	Awareness of mangroves importance in surrounding communities	• Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the community regarding importance of mangroves. • Adani Foundation has also provided 8.95 lacs kg Dry Fodder and 24.25 lacs kg Green fodder in 21 villages of Mundra and Anjar Block to support the resource dependent villagers, to avoid their dependency on mangroves. The expenditure for fodder supporting activities was approx. 122.7 Lacs during last FY 2021-22 (Till Sep'21). • Village Gauchar land development for the fodder cultivation to made fodder sustain village & Avail green fodder in scarcity phase. With the support of Gauchar Seva Samiti Grassland development in Siracha – 85 Acre & Zarpara – 25 Acre done which resulted in total production of 82 ton. • Other than this dedicated security guard with gate system deployed by APSEZ across the coastal area and no any unauthorized persons allowed within coastal as well as mangrove areas. • Refer CSR report attached as **Annexure – 1**.

<table>
<tr><th>Sr. No.</th><th>Condition</th><th>Compliance Status as on 30-09-2021</th></tr>
<tr><td></td><td></td><td>Details of activities done as a part of GCZMA recommendations and NCSCM mangrove conservation action plan were submitted as a part of last half yearly EC compliance report for the period Oct'20 to Mar'21.

For demarcation of HTL and CRZ areas, NCZMA has approved the CZMP of Kutch region vide 39th NCZMA meeting, held on 13.01.2020. However, the maps are yet to be published, Once the maps are published, NCSCM will issue the final maps for the project area of APSEZ. The said maps will then be submitted to GCZMA and MoEF&CC by APSEZ.</td></tr>
<tr><td>iii</td><td>The violations of specific condition of all the ECs and CRZ clearances, if any, will be examined and proceeded with the provisions of EP Act, 1986 independently.</td><td>Complied

During the said site visits from various regulatory authorities and as per the compliance certification received, there was no non-compliance observed.
<table>
<tr><th>Sr. No.</th><th>Authority</th><th>Date of Visit</th><th>Purpose of Visit</th></tr>
<tr><td>1</td><td>RO, MoEF&CC, Bhopal</td><td>21st – 22nd Dec, 2016</td><td>EC Compliance Certification of WFDP</td></tr>
<tr><td>2</td><td>RO, MoEF&CC, Bhopal</td><td>3rd May, 2018</td><td>EC Compliance Certification of WFDP & MSEZ</td></tr>
<tr><td>3</td><td>RO, MoEF&CC, Bhopal</td><td>3rd & 4th Sep, 2019</td><td>Compliance of the order of the Hon'ble HIGH COURT of Gujarat vide letter dated 22nd Aug. 2019 w.r.t. compliance verification of MoEF&CC order dated 18th Sep, 2015.</td></tr>
<tr><td>4</td><td>RO, MoEF&CC, Bhopal</td><td>27th & 28th Jan, 2020</td><td>EC Compliance Certification of WFDP</td></tr>
<tr><td>5</td><td>NEERI, Nagpur</td><td>26th Nov, 2020 & 6th / 7th Oct, 2021</td><td>EC Compliance verification of MSEZ</td></tr>
<tr><td>6</td><td>SPCB, Gandhinagar</td><td>17th March, 2021</td><td>CC&A Compliance Certification of existing facilities developed under WFDP</td></tr>
<tr><td>7</td><td>Joint Review Committee</td><td>1st to 3rd Sep, 2021</td><td>Compliance of the order of the Hon'ble HIGH COURT of Gujarat vide letter dated 22nd Aug. 2019</td></tr>
</table></td></tr>
</table>

Sr. No.	Condition	Compliance Status as on 30-09-2021
		<table><tr><td></td><td></td><td></td><td>w.r.t. compliance verification of MoEF&CC order dated 18th Sep, 2015.</td></tr></table> It may also be noted that GPCB, Regional Office does regular site visit of APSEZ area and no non-compliance observed. Last visit of Regional Office, GPCB was done on 09.04.2021 for West Port and 23.09.2021 for Main port. APSEZL has submitted the reply to the site visit report vide letter dated 12.04.2021 & 28.09.2021 incorporating details of action taken in respect of the observations of the GPCB representative. Details of the same are attached as **Annexure – 10**.
vi	There will be no development in the area restricted by the High court of Gujarat. APSEZ shall abide by the outcome of the PIL 12 of 2011 and other relevant cases.	Complied The order passed by Hon'ble high court in context of PIL 12 of 2011 vide dated 10th Nov 2011. Subject PIL has been disposed off by Hon'ble High Court vide their order dated 17.04.2015 and now there is no restriction on development in the subject area. The order reads as *"In view of the aforesaid discussion, we do not find any merit in this writ petition. This writ petition fails and is accordingly dismissed. No order as to cost."* Copy of the order was submitted along with half yearly EC Compliance report for the period Apr'18 to Sep'18. Considering the above status and in line to submission of compliance of all the directions under this order, this condition is closed.
vii	APSEZ will submit specific action plan to protect the livelihood of fishermen along with budget.	Complied. Adani Foundation (AF) is the CSR arm of the Adani Group actively working for upliftment of the communities in the surroundings of various project sites of Adani Group. AF has prepared a specific action plan to protect livelihood of fishermen at Mundra. Various initiatives, as stated below are discussed in detail in the report namely "Silent Transformation of Fisher folk at Mundra". Said report also includes the information

Sr. No.	Condition	Compliance Status as on 30-09-2021
		related to the planned expenses to the tune of approx. 13.5 Cr. INR for various initiatives for the next five years (2016 – 2021) (Budget details provided in Page No. 68 of report). Copy of the same is already submitted to MoEF&CC vide our letter dated 10.09.2016. Till, Sep'21 approx. 9.78 Cr. INR, has already been invested. Further, details regarding the expenditure incurred against the commitment are attached as **Annexure – 14**. APSEZ couldn't spend expenditure as committed during March'20 to Sep'21 due to Corona pandemic. However, the remaining budget will be spent in upcoming years for committed fisher folk activities. APSEZ is carrying out various initiatives specific to the Fisherfolk community which includes: • **Vidya Deep Yojana** Developing school preparedness programme and empowering balwadis at fisherfolk settlement Under this scheme, 4 balwadis at different settlement has been constructed This programme include nutrition food, hygiene, awareness of health, cleanliness, discipline, regularity and development of basic age appropriate conception • **Vidya Sahay Yojana – Scholarship Support** All basic education supportive facilities have been created to promote education in fisher folk community. • **Adani Vidya Mandir** Children of the family with the income of salary less than 1.5 lac/annum are admitted School focusses on nutrition food, uniform and other services to the children for free. • **Fisherman Approach in SEZ** After due consultative process, APSEZ has provided 7 fishermen access roads for to approach to the sea for fishing activity. • **Machhimar Arogya Yojana** The Fisher folk communities are disposed to several water and air abided diseased due to exposure to unhygienic working conditions. Frequently Special Health care Camps are organized at Vasahat. Our Mobile health care unit van regularly visit fisher folk settlements • **Machhimar Kaushalya Vardhan Yojana** Based on need assessment a number of trades were introduced through the Adani Skill Development Centre in Mundra, where in fisher folk youth could join and get a number of technical and non-technical training

Sr. No.	Condition	Compliance Status as on 30-09-2021
		• **Machhimar Sadhan Sahay Yojana** Fishing material support was provided by AF at Mundra as per the requests of Pagadiya fishermen. According to their needs, fishing nets, ropes, buoys, ice boxes, crates, weighing scales, anchors, solar lights etc., were provided • **Machhimar Awas Yojana** Shelters, equipped with basic facilities of a toilet and pure drinking water have been constructed for living while fishing and to provide a healthy and hygienic residence. • **Machhimar Shudhh Jal Yojana** This scheme of providing potable water has helped in reducing the drudgery of women and contributed largely towards general wellbeing • **Sughad Yojana** Toilets for men and women are constructed at all three Vasahats.Infrastructure was accompanied with continuous awareness campaign on hygiene sanitation and use of toilets in particular. • **Machhimar Akshay kiran Yojana** Solar street lights at each settlement have been installed. For fish landing shed and school extension room have been fitted with solar invertor allowing late evening video shows for awareness and fish sorting work at ease. • **Machhimar Suraksha Yojana** Distance Alarm Transmission System – DATS' project was introduced in order to promote safety of the fishermen. Forced to be at sea to earn their livelihood puts the lives of many fishermen at risk • **Machhimar Ajivika Uparjan Yojana** Mangrove plantation in the area as means of alternate income generating activity for the fisher folk community during the non-fishing months. During the non-fishing months, the fishermen under usual circumstances were benefited by other alternate economic activity to sustain them. • **Bandar Svachhata Yojana** Waste bins have been provided for proper collection and segregation of waste. Further, APSEZ is actively working with local community around the project area and provides required support for their livelihood and other concerns through the CSR arm – Adani Foundation. Adani Foundation is working in main four persuasions as below. Education Community Health Rural Infrastructure

Sr. No.	Condition	Compliance Status as on 30-09-2021
		Sustainability Livelihood Brief information about activities in the main four persuasions is mentioned below. Other than this, Adani Foundation has also worked for fight against COVID – 19 pandemic situations during this compliance period Activities carried out for the same are summarized as below.

Area	Activity
Fight Against COVID-19	• Started Covid care centre service at Samudra town ship to Provide medical services at 24 x7 hrs. Home Visit for Medical Prescription and advise for further treatment & co-ordination. • AF team voluntary performed patients care and co-coordination duty at GKGH, Bhuj for 23 days. • AHMPL, Mundra was converted into Covid Hospital with 100 bed Facilities with oxygen to extend Covid medical treatment over community. All related coordination done by our team for more than 353 OPD and IPD. • Provided Oxygen Concentrator machines for Home isolated patients resulted in goodwill. • Provide Dead body van service to shift covid demise patients to Crematorium with all dignity. • Precautionary voice message dissemination through Awaj de voice message service Over Community. • Started Village Sanitizing activities and Ukalo, Vitamin C tablet distribution
Community Health	• Mobile Heath Care Units and Rural Clinics • 9 Rural Clinics • 06 from Mundra, 02 from Anjar & 01 from Mandvi block treated; • 3843 patients • 31 villages covered, with 94 types of general and lifesaving medicines through Mobile healthcare unit • 3364 patients benefited during six months • 06 patients are provided Dialysis treatment at 133 times with nominal charges at Adani Hospital. • 471 –Economically Challenged patients have been supported for operation, OPD, IPD, Medicines and lab-test. • For Preventive health care General and multispecialty camps Pediatric camp, General Health camps in 9 villages and Super specialist camp which benefitted more than 1100 patients of Mundra Taluka. • 16 Senior Citizens have been linked with Government Niradhar pension scheme, 34 senior Citizens linked up with Ayushman Yojana and 67 Senior Citizens were referred to GKGH Bhuj for chronic illness.

Sr. No.	Condition	Compliance Status as on 30-09-2021	
		Sustainable Livelihood – Fisher folk, Agriculture & Women	• Average 75 KL of water was supplied to 676 households at 5 fisherman vasahat on a daily basis under Machhimar Shudhh Jal Yojana and other 4 fisherman vasahat has linkaged with water through GWIL and Mundra Gram Panachayat from which 355 households get benefited. • 11 Fisher Youth were interviewed among that 5 have been selected. Our target is to support 60+ Fisherman in alternative livelihood till March 2022. • Facilitation of Pagadiya Welfare scheme & boat license sanction letter to 06 Fishermen. Till date 59 Form has been submitted to fisheries department, Bhuj for pagadiya and boat License. • During the Taukate cyclone fishermen family had been shifted to safe Places As well as support to disaster management team for advance preparation. • To promote Natural farming Adani Foundation has originated cow-based farming initiative with interconnected techniques which can increase farmer yield. • 23 wormicompost unit have been set-up. Which is facilitated through Government with farmer Contribution. • 50 Farmers have started to preparing Jiva Mrut & Gaukrupa Amrutam Bio-fertilizer and using in agricrop. Series of Training is arranged by ATMA and Adani Foundation. • Two Farmers Groups is registered with ATMA–Agricultural technology management Agency–it will leverage Government schemes. • Adani Foundation provides Good Quality dry and green fodder to 24 Villages. Project is covering total 14116 Cattels / 3008 farmers and hence enhancing cattle productivity. Dry Fodder 895398 Kg Green – 2425230 Kg. • Fodder Cultivation-To made fodder sustain villages - 25 Acre Gauchar land of Siracha village is being cultivated for the same. • Current year for the dates Packaging and Marketing, KKPC Started to sell 10 Kg capacity packaging Box at Minimum Profit Margin At Rs.29/Boxes which resulted in turn over of Rs. 24 Lacs with Profit of 1 Lac. This initiative has supported more than 1800 farmers indirectly. • Dragon fruit farming is on going by Five farmers each farmer is doing in 2 Acre farm –Total 11000 plants. • Skill Development and Income Generation –Adani Foundation is working with 15 Self help group and supporting to develop entrepreneur skills to become self reliant, sourcing more than 350 women to absorb in various job.
		Education	• The Virtual and Offline classes (Shrisikshan) with parents permission with all precautionary measures as Government Guide Lines. Its very encouraging that inspired by Our Sheri Sikshan Initiative-Gov Teachers also started same approach.

Sr. No.	Condition	Compliance Status as on 30-09-2021	
			• Online Outreach – 259 Students • Individual Home visit – 415 Students • Sheri sikshan and school students - 838 Students • Uthhan First phase 17 Schools and 2951 students were part of the program, and second phase 14 Schools and 1952 Students were part of the programme. Total 4903 students are getting benefit from Utthan. • Coaching of 49 students for National Means cum Merit Cum Scholarship Scheme (NMMS). • Coaching of 34 Students for Javahar Navoday Entrance Exam by Utthan Sahayak since last Three Months. • Total 394 webinar and capacity building program were arranged for Utthan Sahayaks and Government Officers. • Arranged Virtual Tour regarding Plastic Waste Management with Municipal Corporation, Surat and aware about waste Collection, Segregation, treatment and Disposal Process. Total 178 Students were participated for the same. • 508 underprivileged students of Fisherman & Maldhari communities from 8 villages taking education at the Adani Vidya Mandir school • Celebration of various days is villages school.
		Rural Infrastructure & Environmental Sustainability	Adani foundation designed and build various structure and provide service in the Health, Education, agriculture and sustainable livelihood area. **WORK COMPLETED** • 31 RRWHS structure have been completed • 45 Bore-well recharging activity is completed. • Development Approach road Prasala vadi vistar Gogan Pachim at Zarpara • Earthen bund Repairing work at Pond, Luni. • Pre-monsoon activity Approach repairing, Village Pond Lake strengthen and river cleaning (babul cutting) work is ongoing in Various Villages • Approach Road repairing at Various Fishermen Vasahat (ARC). **WORK IN PROGRESS** • Construction of common Gathering Rooms at Wandi village. • Development of Chain Link Fencing at tree forestation at Nana Kapaya. • Construction of community gathering Shed at Mundra -work in final Stage. **ENVIRONMENT SUSTAINABILITY PROJECTS** • **Miyawaki Forest Development, Nana Kapaya** - Plantation of 4965 saplings of different 42 species is completed which will result in dense forest within 2 years

Sr. No.	Condition	Compliance Status as on 30-09-2021	
			• **Smruti Van** – Plantation more than 40,000 sapling with more than 115 species through Miyawaki methodology. • **Ecosystem Restoration, Guneri** – Grassland ecosystem restoration and mangrove conservation in 40 Ha area over a period of 4 years • **Multi-species Mangrove Park** - Adani Foundation at Mundra 's initiated multi-species plantation of mangroves in Kutch association with GUIDE. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. Current year 3 hector development is planned to extend multi-species mangrove plantation. • **Home biogas** - Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers to Uthhan Villages phase wise. Current year supported 117 home biogas in Dhrub, Zarpara and Navinal Villages. • **Seaweed Culture** - A pilot cultivation facility (5 KL tanks in 6 nos.) for the farming of different economically important seaweeds in the tanks on the onshore has been established and commenced the cultivation trials with red seaweeds Kappaphycus alvarezii, Gracilaria dura and green seaweed Ulva. • **Water Conservation Projects** – ✓ A large number of water harvesting structure (18 Nos. of check dams and Augmentation of 2check dams (1 Check dam current year). ✓ Ground recharge activities (pond deepening work for more than 52 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan ✓ Roof Top Rain Water Harvesting 90 Nos. (35 Nos current year) which is having 10,000 litre storage ✓ Recharge Borewell 125 Nos (50 Nos current year) which is best ever option to. ✓ Drip Irrigation 980 Farmers (56 Application current year) ✓ Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. ✓ Luni Pond Bund Repairing Work.
		Skill Development	Over the last few years, Adani Skill Development Center has assessed various aspects of the technical, leadership and soft skills gaps that organizations, in general, face and accordingly focuses on imparting required training in those areas in partnership with various colleges and institutes. **<u>ASDC, Mundra</u>** • RPL–Recognition of Prior Learning Training given to Adani Group Contractual Employees–Total 218 Employees have been benefitted

Sr. No.	Condition	Compliance Status as on 30-09-2021
		• Junior Crane Operator practical training to 36 Candidates for (Group-1, 2 & 3) At MICT Port. • Guest Lecture on Mehendi products, Beauty Therapist & Resin art Total 100 candidate have been benefitted. • Certificate Distributed to Mud work candidates at MICT Colony – 30 women learnt Mud work. • Volunteer Support in GKGH and Adani Hospital during covid pandemic. • 21 students were coordinated for interview in seabird CFS of Mundra. **ASDC, Bhuj** • Launched New online General Duty Assistant & Beauty Therapist for 63 candidates under (DDU-GKY). • Soft Skills Training Certificate distribution to Prisoners of Palara Special Jail. • Guest lecture on "Tally: Older vs New" & "Concept of Emerging E-way Bill" **Total Beneficiaries:** • Technical Training: 365 Nos. • Sof-Skill Training: 52 Nos. Please refer **Annexure – 1** for full details of CSR activities carried out by Adani Foundation in the Mundra region. Budget for CSR Activity for the FY 2021-22 is to the tune of INR 1628.45 lakh. Out of which, Approx. INR 423.18 lakh are spent during current compliance period i.e. Apr'21 to Sep'21. Till Sep'21, Adani Foundation has done total expenditure of INR 137 Cr. for CSR activities in Kutch region since its inception.
viii	APSEZ will voluntarily return the grazing land, if any, in their possession.	Point noted. All lands are acquired through proper procedure prescribed by State Government. However, APSEZ has agreed for voluntarily giving land back to Zarpara village for the purpose of Gauchar. Land has been identified in the presence and confirmation of Gram Panchayat. Necessary procedure has been initiated by APSEZ vide its letter dated 09th Aug 2012 with concerned revenue authority with respect to surrender of gauchar land at village Zarpara. Same has been taken up by revenue department for necessary procedure of transfer and is under process. Details of the same were submitted along

Sr. No.	Condition	Compliance Status as on 30-09-2021
		with half yearly compliance report for the period Apr'19 to Sep'19.
ix x.	A regional strategic impact assessment report with a special focus on Mundra region will also be prepared. The cost towards these studies will also be borne by PP. In the subject matter of thermal power plant, the proposed regional strategic Impact assessment analysis will take In to account salinity aspect along with Its potential environmental Impact to suggest future corrective actions as well as the guiding tool on extension and addition of the capacities.	Complied This reply covers direction no ix and x. 1. APSEZ vide its letter dtd. 24th Feb 2014 has submitted draft ToR for preparation of CIA report to GCZMA for their approval. 2. GCZMA vide its letter dtd. 19th Dec 2014, has approved ToR for CIA. 3. Based on the ToR finalized by GCZMA (as per the instructions of MoEF&CC) for carrying out regional impact assessment study, APSEZ awarded the work to NABET accredited consultant M/s. Cholamandalam MS Risk Services Ltd. to carry out the studies, vide SO dtd 10th Feb 2016 as stated in these directions. 4. Primary baseline environmental monitoring data collection during March – June 2016 and published secondary data on various environmental attributes have been considered for the study. 5. The study has been concluded and the final report was submitted to GCZMA and MoEF&CC for their consideration vide our letter dated 30.04.2018. 6. Reminder letter has been submitted to GCZMA for their comments and consideration vide letter dated 4th Jan 2019. Details of above chronology were submitted along with last half yearly compliance report for the period Apr'19 to Sep'19. Total cost of the study is approx. INR 1.3 cr. which is financed by APSEZ. The stated study was carried out in following 3 phases • Baseline data collection and review of the past EIA reports and clearances issued to APSEZ. • Mathematical modelling and other technical studies for identification of potential impacts (for the year 2030) of the approved and existing project activities.

Sr. No.	Condition	Compliance Status as on 30-09-2021
		• Development of macro level EMP for the phase wise implementation of actionable points. As part of the study, following modelling exercises / technical studies have been carried out to study the impacts on all environmental attributes: • Ambient air quality • Marine (Hydrodynamic, Thermal & Salinity dispersion, Sediment transport) • Noise level • Traffic assessment • Oil spill contingency plan • Water resource and salinity ingress • Land Use / Land Cover • Socioeconomic, Regional infrastructure • Waste management • Ecology, Bio diversity and Fisheries • Shoreline change assessment Preparation of these reports require extensive use of modelling software and study of the available information / research reports to assess the impacts on individual attribute of environment. Based on the modelling outcomes and findings of the technical studies, a macro level environment management plan is prepared. Inline to the present stage of the project, APSEZ is already complying, as per Environment Management Plan and further recommendations, applicable to APSEZ as mentioned in the EMP, wrt Traffic Management Plan, Ground water quality management, Salinity ingress programme, Air and Noise quality Management, Surface and Marine water quality management, Ecology and Biodiversity Management, Solid & Hazardous waste management, Socio-economic Management and Shoreline Management, will be implemented in phase wise manner as per the progress of development within the boundary limits of APSEZ. The final CIA Report was prepared inline to the ToR by Chola MS and the same was submitted to the GCZMA on

Sr. No.	Condition	Compliance Status as on 30-09-2021
		30.04.2018. Details of the same were submitted along with half yearly EC Compliance report for the period Apr'18 to Sep'18. Presentation on the findings of the report was made to GCZMA committee on 4th October 2019 and after detailed discussion, authority has decided to constitute committee to discuss the details of the report further. Reminder Letter vide dated 07.09.2020 & 10.03.2021 submitted to the GCZMA, Gandhinagar for further directives to present the findings of the CIA report in detail. Details were submitted as a part of last half yearly EC compliance report for the period Oct'20 to Mar'21. However, APSEZ is already complying with the Environment Management Plan (applicable to APSEZ) suggested in Cumulative Impact Assessment report. The detailed compliance, applicable to APSEZ is attached as **Annexure – 15**.

Annexure – 1

adani
Foundation

CSR KUTCH

Six Monthly Report 2021-22

Adani Foundation
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PREFACE

Corporate Social Responsibility in India is going through an interesting phase where the need for community centered impact is increasingly becoming more important than ever before. It is not just about the compliance with the laws an regulations but also about transitioning beyond the mandated CSR, Stakeholder engagement is a critical tool to ensure a comprehensive approach in carrying out responsible business and within that community ownership holds an important place.

In Year 2021-22 Uthhan Project spread the wings from 17 Primary schools to 31 Primary schools with MOU with Education Department. Natural Farming Promotion concept is started as a mission with training to 500+ Farmers and pure chemical free farming with 50+ Farmers. Mangroves costal biodiversity, water harvesting structures and Tissue is ongoing sustainable Project with proper documentation and demarcation. Adani Vidya Mandir has proven best in education by reaching to unreached through digital technology, happy to see the fisherman students studying sincerely sitting in fisherfolk settlements by operating tablets. "

Under guidance of seniors proper frame work was developed for supporting community as a bridge between various Government schemes and needy people by "Community Resource Centre" its true need and real sustainable way. Fisherman and women employment sourcing created very positive impact as a regular source of income for them.

Adani skill Development center started General Duty Assistant Course training under DDUGKY. The ASDC is committed to the cause of the deprived and underprivileged to generate employment through enhancing skills. It has been working relentlessly which resulted in rapport building with District Administration Kachchh also.

Success is due to presence of torch barer and mentor in life who is Respected Dr. Priti Adani. We heartily thanks our Rakshit bhai, Respected Gadhvi sir and Respected COO sir for guidance and motivation.

We wish all the very best to whole Adani Foundation Parivar !

INDEX

Environment Sustainability Projects : Ensuring ecological balance, protection of flora and fauna, terrestrial and coastal spices conservation, welfare, agro forestry, conservation of natural resources and maintaining quality of soil, air and water

Reducing Carbon footprint

1. Miyawaki – Nana Kapaya

Nana Kapaya village and proposed site for Miyawaki- Dense Plantation is very close to many industries in and around the Mundra landscape. This area is also very close to main roads and coastal creeks. Mainly dense to sparse Prosopis juliflora- Ganda Bavar cover is recorded surrounding to project site with very few scattered native trees like- Limda, Deshi Bavar etc. Shrubs species like- Akado and Aavar are also predominant close to site; while, grasses like Chhabar and Dhrab are recorded in proposed plot area.
As shared and discussed by villagers, this proposed plot is also very close to sewage water tank and nallahs; and proposing for watering to our proposed plantation.

As discussed with villagers and Adani Foundation, we proposed the close or dense plantation at site- called 1Miyawaki Types of Plantations with following four major compartments (45X20 meters approx.) and with following strategies:

1. Mixed Plantation dominant Drought Resistant Plants
2. Mixed Plantation dominant by Larger Leaves
3. Mixed Plantation dominant by Saline Resistant Plants
4. Mixed Plantation dominant by Medicinal Values.

Plantation of 4965 saplings of different 42 spices is completed which will result in dense forest within 2 years

Reducing Carbon footprint

Species Name/ Botanical Name	Local Name in Gujarati	Saplings Required	TOTAL ACTUAL	TOTAL ACTUAL	Mixed Plantation dominant Drought Resistant Plants PLOT 1	Mixed Plantation dominant by Larger Leaves PLOT 2	Mixed Plantation dominant by Saline Resistant Plants PLOT 3	Mixed Plantation dominant by Medicinal Values PLOT 4	Mixed Plantation dominant Drought Resistant Plants PLOT 1	Mixed Plantation dominant by Larger Leaves PLOT 2	Mixed Plantation dominant by Saline Resistant Plants PLOT 3	Mixed Plantation dominant by Medicinal Values PLOT 4
Acacia nilotica (L.) Del. subsp. indica (Bth.) Brenan	દેશી બાવળ	300	500	500	200	75	150	75	6	15	9	15
Cordia gharaf (Forsk.) E.&.A.	નાના ગુંદા, લિયાર	500	400	400	80	100	140	80	16	11	10	14
Pithecellobium dulce (Roxb.) Bth.	ગોરસ આમલી	400	400	400	80	100	150	70	16	11	9	16
Moringa oleifera Lam.	મીઠો સરગવો	300	300	300	75	75	90	60	17	15	15	19
Salvadora persica L.	ખાળી જાળ- પીલુડી ખાળી	100	250	250	40	60	100	50	32	19	14	23
Derris indica (Lam.) Bennet	કરંજ	200	200	200	25	75	25	75	52	15	55	15
Azadirachta indica A. Juss.	લીમડો	200	200	200	40	40	70	50	32	28	20	23
Moringa concanensis Nimmo	ખારો- જંગલી સરગવો	200	200	200	50	50	60	40	26	23	23	29
Morus alba L.	શેતુર	200	200	200	50	50	50	50	26	23	28	23
Tinospora cordifolia Roxb.	ગળો, ગિલોય	200	200	200	50	50	50	50	26	23	28	23
Tecomella undulata(Sw.) Seem.	રગત રોહિડો	300	200	200	50	60	60	30	26	19	23	38
Commiphora wightii (Arn.) Bhandari	ગુગળ	200	200	200	75	25	25	75	17	46	55	15
Dalbergia sissoo Roxb.	સીસમ	200	200	200	100	25	25	50	13	46	55	23
Zizyphus mauritiana Lam.	બોરડી, મોટા બોર	200	180	180	50	30	70	30	26	38	20	38
Vitex negundo L.	નગોડ	200	150	150	35	55	30	30	37	21	46	38

Reducing Carbon footprint

Species Name/ Botanical Name	Local Name in Gujarati	Saplings Required	TOTAL ACTUAL	TOTAL ACTUAL	Mixed Plantation dominant Drought Resistant Plants PLOT 1	Mixed Plantation dominant by Larger Leaves PLOT 2	Mixed Plantation dominant by Saline Resistant Plants PLOT 3	Mixed Plantation dominant by Medicinal Values PLOT 4	Mixed Plantation dominant Drought Resistant Plants PLOT 1	Mixed Plantation dominant by Larger Leaves PLOT 2	Mixed Plantation dominant by Saline Resistant Plants PLOT 3	Mixed Plantation dominant by Medicinal Values PLOT 4
Adhatoda zeylanica Medic.	અરડૂસી	100	100	100	15	20	25	40	86	57	55	29
Parkinsonia aculeata	રામ બાવળ	100	100	100	20	10	50	20	65	114	28	58
Albizia lebbeck (L.) Bth.	કાળો શિરીષ	100	100	100	25	20	35	20	52	57	40	58
Terminalia arjuna (Roxb.) W. & A.	અર્જુન સાદડ	100	80	80	20	20	20	20	65	57	69	58
Grewia tiliaefolia Vahl var. tiliaefolia	ફાલસા	100	60	60	15	20	10	15	86	57	139	77
Abrus precatorius L.	ચણોઠી	50	50	50	15	10	15	10	86	114	92	115
Aegle marmelos (L.) Corr.	બીલીપત્ર	50	50	50	15	10	10	15	86	114	139	77
Ailanthus excelsa Roxb.	અરડૂસો	50	50	50	15	10	10	15	86	114	139	77
Asparagus racemosus Willd. var. javanicus	શતાવરી	50	50	50	15	10	10	15	86	114	139	77
Cassia fistulaL.	ગરમાળો	50	50	50	15	10	10	15	86	114	139	77
Cordia dichotoma Forst.	મોટા ગુંદા	50	50	50	15	10	10	15	86	114	139	77
Holoptelia integrifolia	કણજી	50	50	50	10	15	10	15	129	76	139	77
Murraya koenigii (L.) Spr.	મીઠો લીમડો	50	50	50	10	15	10	15	129	76	139	77
Psidium guajava L.	જામફળ	50	50	50	15	10	10	15	86	114	139	77
Punica granatum L.	દાડમ	50	50	50	15	10	10	15	86	114	139	77
Syzygium cumini	જાંબુ	50	50	50	15	10	10	15	86	114	139	77

Reducing Carbon footprint

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Tamarindus indica L.	આમલી ખાટી	50	50	50	15	10	10	15	3	6	4	Tamarindus indica L.
Butea monosperma (Lam.) Taub.	કેસુડો	30	30	30	5	10	5	10	8	6	7	Butea monosperma (Lam.) Taub.
Manilkara zapota (L.) van Royen	ચિકકુ	30	30	30	5	10	5	10	8	6	7	Manilkara zapota (L.) van Royen
Mimusops elengi L.	બોરસલી	30	30	30	5	10	5	10	8	6	7	Mimusops elengi L.
Plumeria rubra L.	ચંપો સફેદ કે ગુલાબી	30	30	30	5	10	5	10	8	6	7	Plumeria rubra L.
Ficus benghalensis L.	વડ	10	10	10	2	4	2	2	20	15	18	Ficus benghalensis L.
Ficus religiosa L.	પીપળો	10	10	10	2	4	2	2	20	15	18	Ficus religiosa L.
Gmelina arborea L.	શેવન	30	5	5	1	1	1	2	40	59	35	Gmelina arborea L.
Arygyreia nervosa (Burm.f.) Boj.	સમુદ્ર શોષ	50	0	0	0	0	0	0	0	0	0	Arygyreia nervosa (Burm.f.) Boj.
Bauhinia racemosa Lam.	આસીત્રો	50	0	0	0	0	0	0	0	0	0	Bauhinia racemosa Lam.
Ficus racemosa L.	ઉમરો	10	0	0	0	0	0	0	0	0	0	Ficus racemosa L.
Grewia tenax (Forsk.) Fiori	ગાંગણી	300	0	0	0	0	0	0	0	0	0	Grewia tenax (Forsk.) Fiori
Grewia villosa Willd.	લુસ્કા	200	0	0	0	0	0	0	0	0	0	Grewia villosa Willd.
Prosopis cineraria (L.) Druce	ખીજડો	200	0	0	0	0	0	0	0	0	0	Prosopis cineraria (L.) Druce
Salvadora oleoides Decne.	મીઠી જાળ-પીલુડી મીઠી	100	0	0	0	0	0	0	0	0	0	Salvadora oleoides Decne.

TOTAL SAPLINGS PLANTED 4965

Reducing Carbon footprint

Smritivan Memorial park– Bhuj

Smritivan Memorial park is a unique initiative by Prime Minister in order to commemorate the death of about 13,805 people during this massive earthquake which had its epicenter in Bhuj District.

The memorial will occupy around 406 acres of space of the **Bhujia Dungar near Bhuj, Kutch** that will show people's **oppressive response to a natural disaster**.

As a part of this Smritivan Memorial Park, it will have a museum, convention Centre, sunset point and **Ecological park** with around varied species of trees to attract different biodiversity.

For the ecological park, approx. **24 acres** of land has been demarcated, wherein it is proposed to plant **~3 lakh local** species trees.

Reducing Carbon footprint

Smritivan Memorial park– Bhuj

Under Phase – 1 project, Govt of Gujarat through GSDMA will be planting across **1 lakh trees, across 8 acres** through "**Miyawaki" methodology** (Japanese technology of tree plantation). They have already enrolled the services of **M/s Forest Creator**, a Mumbai, based agency expertise in carrying out afforestation project, through Miyawaki technology.

Forest Creators have already been involved and completed **58** such kind of project of Terrestrial afforestation, across India and this will be their 59th project. (***Details of project carried out Forest Creator attached***)

Under this project, **~60+ local species of trees** will be planted and further the entire scope of development of Nursery, Soil enrichment, Plantation of saplings, mulching, biomass application, water supply & maintenance for 3 years are considered under their proposal. All Corporate of Kutch has supported fund for the same. APSEZ has done monitory support under CSR and Adani Foundation is coordinating for monitoring

Reducing Carbon footprint

Grassland Ecosystem Restoration project - Guneri

As a part of Biodiversity initiatives, APSEZ has proposed to take the pioneering steps towards building sustainable growth in the Lakhpat region, Kutch by taking the initiation of restoring the natural grassland habitats (Ecological Restoration) along the Guneri village, i.e. ~40 Ha grassland ecosystem in gauchar land, by involving Gujarat Ecology Society (GES) – A Nonprofit Organization, based in Vadodara, Gujarat.

The Restoration & Conservation Plan, will be executed in a phase wise manner over 40Ha of the area, over a period of 4 years

Guneri village is situated north of Lakhpat fort with a population of 967 as per the 2011census. A Biodiversity Management Committee (BMC)already exists there and hence it becomes easy to undertake grassland restoration with the help of committee members.The gauchar land available for restoration is around 100 Ha and about 40 Ha of the area can be considered for restoration. The restoration process will be spread over a time period of three years, starting initially with 10 Ha and slowly moving up to 40 Ha by the third year.

The project aims to take the pioneering steps towards building sustainable growth in the Lakhpat region by taking the initiation of restoring the natural habitats along the Guneri village. In the long run, this area can be declared as a Indigenous and Community Conserved Area (ICCA) in lines with a new category of protection status followed by IUCN.

Despite changes in hydrological regimes, there are certain pockets where unique biodiversity endemic to the area has established itself with relics of past vegetation, theinland mangroves are one such area. Inland mangroves of Guneri village are a living example of the presence of rich estuary in the region sustained by a larger riverine system. The area has been well documented and proposed as Biodiversity Heritage Site. The rare and threatened species present in the area include Helichrysum cutchicum (endemic species), Cistanche tubulosa, Campylanthus ramoissimus, and Sida tiagii. Apart from the listed species, Guneri's unique ecosystem sustains good faunal diversity from herpetofauna to birds to mammals.

It is combined efforts of Environment APSEZ and Adani Foundation under consultation of GEC

Reducing Carbon footprint

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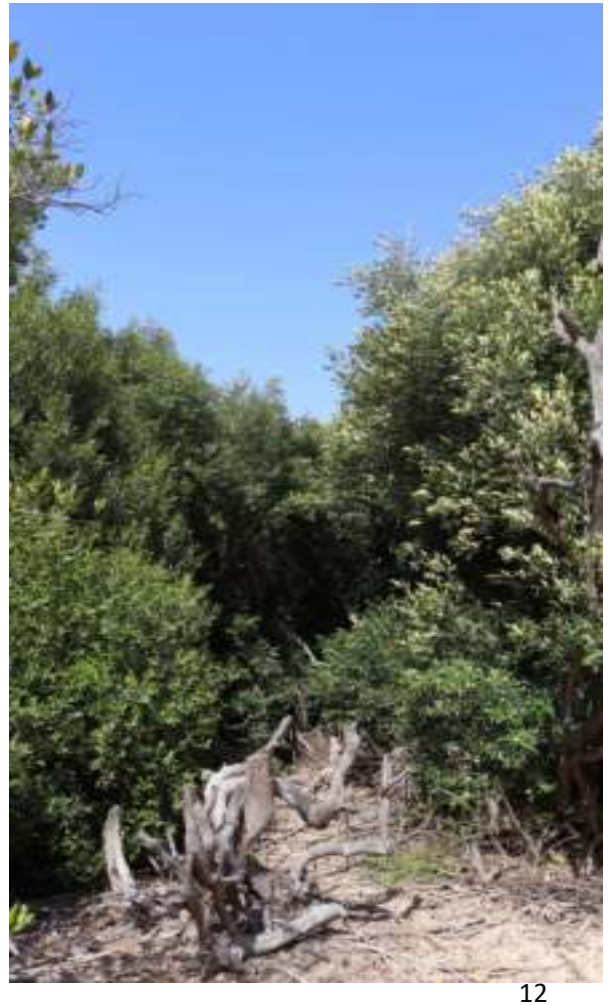


Reducing Carbon footprint

Coastal Biodiversity

In the coastal environment mangroves and mudflats are dynamic ecosystems that usually support a large population of floral and faunal life forms. Mangrove forests are highly productive ecosystems, which provide numerous goods and services both to the marine environment and people. Mangroves in India are spread over nine maritime states and three Union Territories. Gujarat has the longest (1,650 km) coastline among the maritime states of the country. With the second largest mangrove cover in India after West Bengal, Gujarat's mangrove area has increased from 1,140 km2in 2017 to 1,177 km2now.

A major portion of human population of Gujarat is solely dependent on these coastal ecosystems for their livelihood. Thus, several mangrove restoration programme/ activities are in progress in the state. Mangrove restoration activities in Gujarat are mostly single species stands of Avicennia marina. Adani Foundation at Mundra 's initiated multi-species plantation of mangroves in Kutch association with GUIDE. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. Due to geological set up of Kutch where fresh water source is atypical, the survival and growth of mangrove plantation remains poor. Thus, a survival rate of 30% is expected for this multi-species plantation. Mangrove biodiversity park of its kind will help in disseminating knowledge on mangrove ecosystem and simultaneously conserving the species.

Since, some of the mangrove species are not readily available in Kutch, their seeds/ propagates were procured from other districts of Gujarat and other states. The proposed species of mangroves that have the potential for enhancing mangrove biodiversity in and around APSEZL include Rhizophora mucronata, Ceriops tagal, Ceriops decandra, Rhizophora apiculata and Aegiceroscorniculatum.

Current year 3 hector development is planned to extend biodiversity park









Reducing Carbon footprint

Homebiogas -

Home biogas is the Israel based company was founded in 2012 manufactures dynamic biogas unit not only for farm waste but for kitchen waste too.
Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers to Uthhan Villages phase wise. Current year supported 117 home biogas in Dhrub, Zarpara and Navinal Villages.
•Reducing organic waste,
•Transitioning to renewable energy
•Motivation for reduction in use for fertilizer
Promotion of Natural Farming–Home biogas
And Improving the health and living conditions for the millions of families that are still cooking on charcoal and wood. Adani Foundation is not only supporting but creating awareness to save environment and health of the community who regularly cooking on Chula. **It is proven that one hour cooking on Chula is as dangerous as smoking 40 cigrates**.
As a Main Process, Bacteria break down organic waste in a naturally occurring process, and Home Biogas stores and harnesses the energy created so that it can be used for gas.
Earlier we had proceeded for capacity 2 cum but after visit and series of meetings with farmer group –we need to take up plant capacity 6 cum. Till date 120 farmers are utilizing it with satisfaction and considerable outcome by saving Average Rs. 23,400 for gas and fertilizer as well - Homebiogas is base of promotion of natural farming.

2,053 TONS OF ANIMAL MANURE TREATED

159,687 HOURS OF CLEAN COOKING;
4.3 TONS OF BIOGAS CREATED
125 TONS OF FIREWOOD REPLACED;
27,375 HOURS SAVED ON REDUCTION OF FIREWOOD &COLLECTION
625 TONS CO2 EMISSION REDUCTION

Reducing Carbon footprint

See Weed Culture -

Vision

The consortium aims to take a holistic view of transforming seaweed resources as natural capital and use open source knowledge to build an innovative technology platform for harnessing the economic potentials along with the associated ecological benefits thereof. Also, foster a cordial relationship with visionary sponsors and collaborators from India and abroad for sustainable production and utilisation of seaweed resources for the production of innovative products while engaging the coastal communities as direct beneficiaries (human capital) of this unique effort.

Collabration

Agrocel, Piddilite, Adani Foundation has jointly initited the Pilot Project with a objective transform sew weed into Natual Capital as well as engaging community as a human capital.

Achievements

A pilot cultivation facility (5 KL tanks in 6 nos) for the farming of different economically important seaweeds in the tanks on the onshore has been established and commenced the cultivation trials with red seaweeds *Kappaphycus alvarezii*, *Gracilaria dura* and green seaweed *Ulva*. The initial trials have given very promising results and harvested 6-7 times the seeded material in a 40-45 days cultivation period. The successful completion of pilot cultivation trials of Kappaphycus has helped to move forward to set up raceway type tanks of 26 m Length × 6 m Width × 1.1 m Height in 2 nos for large scale cultivation of *Kappaphycus* in Balavadi campus at Juna Bandar, Mundra. The cultivation trials are in progress.

Water conservation Project

Since 10 years considerable Water Conservation Work carried out in Mundra Taluka. Due to satisfactory rain in current year 1.11 mtr ground water table increased in coastal belt of Mundra as per Government Figures. Our water conservation work is as Below.

- A large number of water harvesting structure (18 Nos. of check dams in coordination with salinity department) and Augmentation of 2 check dams **(1 Check dam current year)**
- Ground recharge activities (pond deepening work for more than 52 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers
- Roof Top Rain Water Harvesting 90 Nos. **(35 Nos current year)** which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family.
- Recharge Bore well 125 Nos **(50 Nos current year)** which is best ever option to
- Drip Irrigation 980 Farmers **(56 Application current year)** benefitted in coordination with Gujrat Green Revolution Company
- Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which bore well depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar.
- **Luni Pond Bund Repairing Work is completed**

Water conservation Project

- **Basis of Requirements of Drip Irrigation**

The main source of livelihood being agriculture, the cultivators tend to use more and more underground water for irrigation. Underground waters have gone very highly saline. The use of such water for irrigation has made the soil also saline and the crop yields have dwindled.

- **Process of Drip Support**

Farmer have to applied in the prescribed form of Adani foundation with photograph.
Inspection and verification will be by AF representative.
Ration card, work order of G.G.R.C, 7/12 certificate and all bills must be attached.
Farmer will be informed by telephonic to have form query.
Primary information about farmer land will be received by telephone.
Farm visit within 10 days of after received of application and verified the installation of system as per map and material as per bill will be checked and get farmer feed back.
Verification report submitted to account office.
Payment within 20 days if all document is complete through net banking.
Farmer economic study after our support. – Follow up

- **We have covered 295 farmers and 1422 acre drip irrigation area in last two years which is remarkable for water conservation in first phase – in this phase we have covered 66 farmers and 360 Acre land for the same.**
- **Total 968 Farmers and 5626 Acre Drip since 2011-12 to 2020-21 and process is going on for 56 farmers for year 2021-22.**

Education Projects

Utthan

- The Virtual and Offline classes (Shri sikshan) with parents permission with all precautionary measures as Government Guide Lines. Its very encouraging that inspired by Our Sheri Sikshan Initiative - Gov Teachers also started same approach.
    - **Online Outreach-259 Students**
    - **Individual Home visit-415 Students**
    - **Sheri sikshan and school students- 838 Students**
- Coaching of 49 students for National Means cum Merit Cum Scholarship Scheme (NMMS).
- Coaching of 34 Students for Javahar Navoday Entrance Exam by Utthan Sahayak since last Three Months.
- Total 93 Meetings were carried out with parents to create awareness for education progress. Apart from that aware about Precautionary measures and Covid -19 vaccination and Gyan-setu Program Telecast on Girnar Channel regularly approximately 1503 Mothers were engaged through various events and programmes.
- As Schools learning is not possible, our Library books corner Initiate is not in Function. Hence started to issue Library books to Students during Home Visit.
- Total 394 webinar and capacity building program were arrenged for Utthan Sahayaks and Government Officers.
- **Uthhan First phase 17 Schools and 2951 students were part of the program, and second phase 14 Schools and 1952 Students were part of the programme. Total 4903 students are getting benefit from Utthan.**
- Second phase inauguration was held in last week of September in which District Primary Education Officer was remained present.

Education Projects

- Tree plantation at Utthan Primary School - Total 1000 saplings have been planted in the schools premises and laid responsibility for nurturing and care.
- Celebrated World Emoji Day. Its an unofficial holiday that is celebrated every year on July 17. Students prepared / draw 157 no of various and gifted to their friends and teachers.
- International Yoga Day celebration on 21st June Through Virtually and Physically. More than 520 Family members were participated
- Utthan Students had participated in **Lets us sing the National Anthem Contents** ,an Initiative of Government to Mark Azadi ka Amrit Mahotsav. Total 389 students and 76 parents have participated.
- Celebrated 75th Independence day with Commemorate 75 untold story , A Freedom Fighters who paid remarkable contribution for Indian Independence.

Activities	Location	
	Mundra	Nakhatrana
Silent reading	367	253
Virtual group reading – Classes: 7 and 8	42	30
Book review – Classes: 5 and 6	38	22
Puppetry show- Classes: 1-4	80	28
Total	**527**	**333**

Education Projects

- On the Rakhi festival Students made Eco friendly Rakhi and tied to the **104 Frontline corona warriors** who had paid remarkable service during Pandemic. (Doctor, Police, PHS and health Staff ,Sarpanch as well as Collector, Kutch and DDO ,Kutch).
- Arranged **Virtual Tour** regarding Plastic Waste Management with Municipal Corporation, Surat and aware about waste Collection , Segregation, treatment and Disposal Process. **Total 178 Students were participated for the same.**
- Teacher day celebration by preparing gratitude wall with card at all 17 schools.
- D- Talks are an Initiative of Global Dream, a Disruptive Movement for Universal Foundational Literacy and Numera. Mr. Jatin Upadhayay Talk On "Empowering the Marginalized Communities in Gujarat Through rejuvenating Education.
- World Book Day celebration on 23 April with various activities

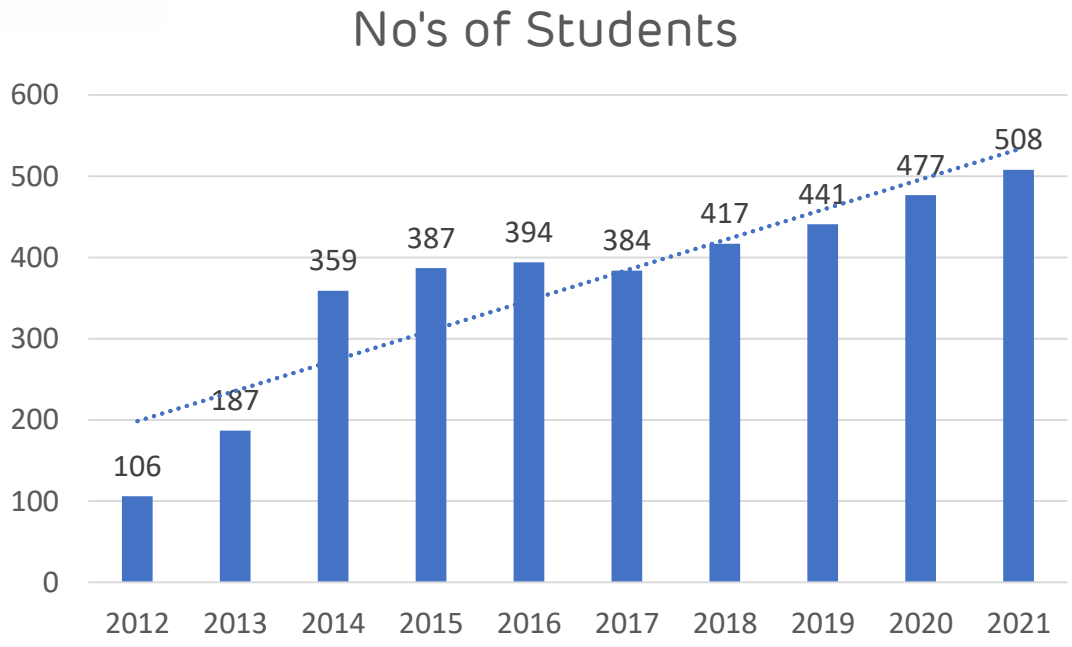
Education Projects

Adani Vidya Mandir, Bhadreshwar
(SDG - 4/4.1)

EDUCATION: FREE AND COMPULSORY – WHAT A WAY TO LEARN LOGIC!" The quote mentioned unfolds the distinguished vision of Adani Foundation to provide cost-free education, food, uniform, books to the children of economically challenged families of Mundra Bock. Adani Vidya Mandir, Bhadreshwar was established in June 2012, with aim of uplifting the communities through education. The school is equipped with excellent infrastructure and resources required for all-round development of the student. The child is given admission in class 1 and is molded to be an educated and a good human being by experienced and compassionate teachers. The school follows a curriculum designed by GSEB.

Due to Covid Pendamic this year Class 1st Admission was done -

Education Projects



Adani Vidya Mandir Bhadreshwar Gujrat Board Standard 10th Examination Result is 100% as board examination was not held due to Covid. Adani Foundation will take all responsibility of further study of students with respect to their interest.

The global upsurge of the Covid-19 pandemic and the resultant lockdown has brought all of us to face such unprecedented times and situations. The challenge was rural locality, network unavailability, lack of health awareness, apprehensions for technology and gadgets and financial crunch to spend on mobile / Internet.

But We did not Give-up and reached out to our students to pursuit educational through virtual platform by various initiatives. Not only that, our teachers started visiting their home and initiated sheri shikshan concept.

Adani Vidya Mandir, Bhadreshwar

Objective

- Provide free and quality education to economically and socially under-privileged students
- Support to students for academics and co-curricular activities and overall well-being

Project Activity

- Balwadis started in 2010, for students in age group of 2-5 yrs. In 2013, this school was built on a donated land
- Free food, education, uniforms, online tablets
- Classes from Gr-I to Gr-X with 22 qualified teachers and 8 helping staffs
- Monthly stay of Gr-X students at school before exam, along with teachers

Outcome

- **508 underprivileged students** of Fisherman & Maldhari communities from **8 villages** taking education at the school
- Educated children have better opportunities of income beyond fishing
- Quality of life and change of mindset of students & families
- With education, many addictions reduced

Closer to SDG

- 1. No poverty
- 2. Zero hunger
- 3. Good Health & Well-being
- 4. Quality Education

Farmers Sustainable Livelihood Projects

Promotion of Natural Farming

- To promote Natural farming Adani Foundation has originated cow based farming initiative with interconnected techniques which can increase farmer yield – our main objective is to improve quality of soil.

- **Implementation**
- Survey and identification of farmers to adopt Natural farming –Total 50 Farmers are selected as criteria in first phase of the Project.
- Water & Soil Testing- Most of Farm soil contain low organic carbon.
- Arranged Workshop & Hands on training for them which was conducted by Agri expert ,KVK and Progressive farmers with 500+ farmers
- 23 wormi compost unit have been set-up. Which is facilitated through Government with farmer Contribution.
- 50 Farmers have started to preparing JivaMrut & Gaukrupa Amrutam Bio-fertilizer and using in agri crop. Series of Training is arranged by ATMA and Adani Foundation
- Two Farmers Groups is registered with **ATMA –Agricultural technology management Agency – it will leverage Government schemes**


adani
પ્રાકૃતિક ખેતી
જીવામૃત : દુનિયાના શ્રેષ્ઠ ખાતર
જીવામૃત બનાવવા માટેની સામગ્રી
વસ્તુ
પ્રમાણ
ઉપયોગીતા
જીવામૃત
પ્રાકૃતિક ખેતી

Farmers Sustainable Livelihood Projects

Pashudhan : " Fodder Support Programme, Individual Fodder Cultivation and Preventive Health Care

- Adani Foundation provides Good Quality dry and green fodder to 24 Villages. Project is covering total 14116 Cattels / 3008 farmers and hence enhancing cattle productivity. Dry Fodder 895398 Kg Green – 2425230Kg
- Fodder Cultivation- To made fodder sustain villages - 25 Acre Gauchar land of Siracha village is being cultivated for the same.
- To protect Cattles against Bovine Brucellosis zoonotic disease, Awareness and vaccination program is ongoing with Kutch fodder fruit & Forest development trust (KFFT) in our 11 Villages , **Total 1076 Female calves** below 3 years have been vaccinated in six months.

Farmers Sustainable Livelihood Projects

Promotion of Horticulture : Date Palm and Dragon fruits

Kutch Kalpaturu Producer Company (KKPC) is established to address the challenges faced by the farmers, particularly to enhanced access for inputs, technology up gradation in Agri practices, output, Sorting, Grading, Value addition & marketing. by the farmers of Mundra Block in the year of 2020. The company is started with 196-shares of 89 Farmers , that is Rs.0.96 lacs Fund in the year of 2020. Right now it is on path of expansion up to 5000 Farmers.

- Current year for the dates Packaging and Marketing, KKPC Started to sell 10 Kg capacity packaging Box at Minimum Profit Margin At Rs.29/Boxes which resulted in turn over of Rs. 24 Lacs with Profit of 1 Lac. This initiative has supported more than 1800 farmers indirectly.
- Regular Director Board Meeting as well as capacity building Training were arranged.

Dragon fruit farming is on going by Five farmers each farmer is doing in 2 Acre farm – Total 11000 plants. Pleasure to share that Auspicious presence of Respected Douglas Smith sir, our CEO ,APSEZ the First batch of fruit was harvested.

Fisher folk Sustainable Livelihood Projects

- Get the technical and Non-technical Man-power Requirement details from CFS and APSEZ, Mundra And inform to fishermen Youth and Leader. Later Eligible fisher Youth had trained for interview facing and soft skilled practices and interviewed in respective Company. 11 Fisher Youth were interviewed among that 5 have been selected. Our target is to support 60+ Fisherman in alternative livelihood till March 2022.

- Fishermen Government Scheme awareness Program was Arranged at Adani Guest House Mundra on 11th Augusts. The schematic details was Felicitated by Fisheries Department Staff. As well as Facilitation of Pagadiya Welfare scheme & boat license sanction letter to 06 Fishermen. Till date 59 Form has been submitted to fisheries department ,Bhuj for pagadiya and boat License.

- ASDC Courses Induction Meeting with Fishermen Youth at Navinal and as well as listed out their name to start computer & Spoken English classes through Adani Skill Development Center, Mundra.

- During the **Taukate cyclone** fishermen family had been shifted to safe Places As well as support to disaster management team for advance preparation.

- Fishermen's boat get across the vessel approach often while fishing Often , which create issue due to miscommunication Between Fishermen and Vessel crew members to clear vessel approach. its delay vessel berthing

Women Empowerment Projects

"You can tell the condition of a nation by looking at the status of its women" – Women are central to the entire development process, be it in an individual family, village, state and to the whole nation.

The below mentioned figure shows determinants associated with the empowerment of women and these are the challenges for us as a CSR to work upon.

Adani Foundation is considering all parameters as a part of Empowerment.

- Education – Uthhan Project promotes girl child education, Creating awareness through various Govt schemes i.e. Vahali Dikri Yojana, Sukanya Samriddhi Yojana etc. till date covered more than 1200 girl child to get benefit out of it.
- Health and Nutrition – Suposhan Project focus on adolescent and Reproductive age women nutrition part. Till date covered more than 12500 women and 8700 adolescent under this Project and brought them to considerable status.
- Skill Development and Income Generation – Adani Foundation is working with 15 Self help group and supporting to develop entrepreneur skills to become self reliant, sourcing more than 350 women to absorb in various job – this will give them identity, confidence and right to speak in any decision for home, village and working area.
- Drinking Water and Sanitation – Total 89 Roof Top Rain Water Harvesting is supported for reducing hassle of the women to fetch the water as well as making clean water available.

Women Sustainable Livelihood Projects

- Total 15 Active SHG Group are engage as Mentioned Income generation activity. We facilitate them capacity building training for quality ,Marketing Finance and team work to made them self sustain.
- Saheli Swa Sahay Juth have completed order of 1500 Sanitary pad from District Health Department.
- "Shradhha Saheli Sva sahay Juth" is won the tender to provide Catering service in Block level Government
- Tejasvini SHG has received order of three layer mask preparation worth Rupees Nine Lacks
- Sonal Saheli Women SHG had supplied 500 KG washing powder to Adani port & Will mar.
- Shradha Saheli & Jay Adhar Saheli have been registered in FSSAI (Food safety and standards Authority of India.

Sr.No	Name of IG activity	Activity	Nos
1	Sonal Saheli Swa Sahay Juth	Phynale & Washing Powder	11
2	Jay Adhar Saheli Swa Sahay Juth	Dry Nasta	12
3	Tejasvi Saheli Swa Sahay Juth	Stiching,Uniform,Bag	12
4	Umang Saheli Swa Sahay Juth	Soft toys, Jula,	13
5	Vishvas Saheli Swa Sahay Juth	Tie & Die, Stitching	13
6	Jay Momay Saheli Swa Sahay Juth	Tie & Die, Stitching	12
7	Meghadhanush Saheli Swa Sahay Juth	Mud Works,	10
8	Saheli Swa Sahay Juth	Sanitary Pad	10
9	Radhe Saheli Swa Sahay Juth	Dhadaki, Small Godadi	14
10	Shraddha Saheli Swa Sahay Juth	Fresh Food	10
11	Chamunda Saheli Swa Sahay Juth	Tie & Die	10
12	Jay shakti Saheli Swa Sahay Juth	Stitching	10
13	Navdurga Saheli Swa Sahay Juth	Sanitary Pad Sale	10
14	Sakhi Saheli Swa Sahay Juth	Sanitaty Pad Sale	10
15	Sonal Krupa Saheli Swa Sahay Juth	Stitching	10
		168 Members in Group	

Women Sustainable Livelihood Projects

Economic Empowerment of women means “Enhancing the role of women as drivers of poverty reduction, promoting female investors and entrepreneurs as per SDG 5” in this half year all 15 women groups did turn over of Rs. 11.5 Lacs. 43 women got job in various SEZ industries by AF intervention and 11 women got absorbed as Gram Rakshak Dal, Bank Sakhi and Bima Sakhi.

fssai

Registration Certificate
Government of Gujarat
Food And Drugs Control Administration
Food Safety and Standards Authority of India
Registration Certificate under FSS Act, 2006

/ Registration Number: 20719013000248

1.	Name and permanent address of Food Business Operator (FBO)	JAY AADHAR SAHELI SVA SAHAY (UTH BARDI , Bansi , Mundra, BHUJ(KUTCH), Gujarat-370421
2.	Address of location where food business is to be conducted / premises	BARDI, Bansi , Mundra, BHUJ(KUTCH), Gujarat - 370421
3.	Kind of Business	General Manufacturing
4.	Photo Identity Card	N/A

This Registration certificate is issued under and is subject to the provisions of FSS Act, 2006 all of which must be complied with by the party food business.

Place / BHUJ(KUTCH)
Issued On / 12-03-2021 (New Registration)
Valid Upto 11-03-2022 (For details, refer Annexure)

Registering Authority

Annexure:
1. Product Annexure
2. Handing Annexure
3. Registration Id Card

Note:

1. **Application for renewal of Registration Certificate can be filed as early as 180 days prior to expiry date of Registration Certificate. You can file application for renewal or modification of Registration Certificate by login into FSSAI's Food Safety Compliance System(https://foscos.fssai.gov.in/) with your user id and password or call us at 1800112100 for any clarification.**
2. **This Registration Certificate is only to commence or carry on food businesses and not for any other purpose.**
3. **This is computer generated Registration Certificate and doesn't require any signature or stamp by authority.**
4. **This Registration Certificate is allowed to conduct food businesses activities having annual turnover upto Rs. 12 Lacs only.**

Community Health Projects

Mobile Heath Care Units and Rural Clinics

9 Rural Clinics

06 from Mundra 02 from Anjar & 01 from Mandvi block treated ;
3843 patients.

31 villages covered, with 94 types of general and life saving medicines through Mobile healthcare unit
3364 patients benefited during six months

Community Health Projects

Swasthaya Seva to needy Patients

06 patients are provided Dialysis treatment at 133 times with nominal charges at Adani Hospital

471 – Economically Challenged patients have been supported for operation ,OPD ,IPD ,Medicines and lab-test.

Promoting preventive health care

Initiated identifying patients of NCD-Non communicable disease by survey which will help to diagnosed chronic disease at early stage and treated as well. From 960 patients - **80 Patients are find symptomatic to Hype, tension, Diabetic.**

As a part of emergency situation - Rural clinic and Mobile van are equipped with Portable ECG machine & Life saving medicines to treat cardiac patients

For Preventive health care General and multispecialty camps Pediatric camp, General Health camps in nine villages and Super specialist camp which benefitted more than 1100 patients of Mundra Taluka.

16 Senior Citizen have been linked with Government Niradhar pension scheme, 34 senior citizen linked up with Ayushman Yojana and 67 Senior Citizens were referred to GKGH Bhuj for chronic illness.

Community Health Projects

Corona Related Work at GKGH and AHMPL

- Started Covid care centre service at **Samudra town ship** to Provide medical services at 24 x7 hrs. Home Visit for Medical Prescription and advise for further treatment & co-ordination.
- AF team voluntary performed patients care and co-coordination duty at GKGH ,Bhuj for 23 days.
- AHMPL,Mundra was converted into Covid Hospital with 100 bed Facilities with oxygen to extend Covid medical treatment over community. All related coordination done by our team for more than 353 OPD and IPD.
- Provided Oxygen Concentrator machines for Home isolated patients resulted in goodwill.
- Provide Dead body van service to shift covid demise patients to Crematorium with all dignity.
- Precautionary voice message dissemination through Awaj de voice message service Over Community.
- Started Village Sanitizing activities and Ukalo, Vitamin C tablet distribution

Community Resource Center

Scheme	Detail	Total
Widow	Widow pension	78
Fishermen	Pagadiya License & Boat License	59
Kitchen Garden Kit	Kitchen Garden kit	20
Mukhya Mantri Yojna	Orphan Covid Child	14
Su-kanya Yojna	Fix deposit	11
Manav Garima	Tools & Kit support	1
Agriculture	Barrel & Chaft Cutter	12
Bal Ayog Yojna	health	19
Senior Citizen	Pension Yojna	06
Vahali Dikri Yojna	Fix deposit	2
Total		222

Though there are huge number of Government welfare scheme but people could not get it s benefit because of awareness and access facilities.

We have started community resource center at Field office Mundra to facilitated Government scheme as below

Till the date more than 2100 beneficiaries and during past six months 222 application have been submitted to Government Department i.e. widow pension scheme, Senior Citizen pension scheme, agriculture and fisherfolk related scheme, child support scheme after pandemic, vahali dikri Yojana etc.

Community Infrastructure

Work Completed

- 31 RRWHS structure have been completed
- 45 Bore-well recharging activity is completed .
- Development Approach road Prasala vadi vistar Gogan Pachim at Zarpara
- Earthen bund Repairing work at Pond, Luni.
- Pre-moon soon activity Approach repairing, Village Pond lake strengthen and river cleaning (babul cutting) work is ongoing in Various Villages
- Approach Road repairing at Various Fishermen Vasahat(ARC).

Work in progress

1. Construction of common Gathering Rooms at Wandi village.
2. Development of Chain Link Fencing at tree forestation at Nana Kapaya.
3. Construction of community gathering Shed at Mundra- work in final Stage.

Adani Skill Development Centre

ASDC, Mundra

Courses	Female	Male	Total
Digital Literacy	10	20	30
Tally with GST	02	03	05
General Duty Assistant	04	01	05
Dori work	21	00	21
Mudwork	18	00	18
Basic Functional English	09	12	21
Beauty Therapist	01	00	01
Manicure and pedicure	20	0	20
Data entry operator	02	0	2
Junior crane operator	00	48	48
Total	87	84	171

RPL – Recognition of Prior Learning Training given to Adani Group Contractual Employees –Total 218 Employees have been benefitted
Junior Crane Operator practical training to 36 Candidates for (Group-1,2 & 3) At MICT Port
Guest Lecture On Mehendi products , Beauty Therapist & Resin art Total 100 candidate have been benefitted.
Certificate Distributed to Mud work candidates at MICT Colony-30 women learnt Mud work.
Volunteer Support in GKGH and Adani Hospital during covid pandemic
21 students were coordinated for interview in sea bird CFS of Mundra.
Centre Inspection by Mr. Krunal (GSDM) At Solar Mundra Under Sankalp project
We Received 4 Star rating from the Department.

Adani Skill Development Centre

ASDC,Bhuj

Courses	Female	Male	Total
General Duty Assistant	47	16	63
Diet & Nutrition (Chanakya College)	36	5	41
Digital Literacy (Chanakya College: 30 + Online: 5 + University: 3)	26	12	38
GST with Tally (Online: 1 + University: 22)	20	3	23
First Aid (Chanakya College)	35	6	41
Basic Functional English	3	1	4
Beauty Therapist	3	0	3
Financial Literacy (Chanakya College: 18+ University: 3)	20	1	21
Junior Crane Operator	0	3	3
Welding Technician	0	1	1
Logistics & Supply Chain Management	0	1	1
Frontline Health Worker	5	0	5
Occupational Safety and Health Administration	1	0	1
Domestic Data Entry Operator	0	1	1
Total	**196**	**50**	**246**

Other Activities:

Launched New online General Duty Assistant & Beauty Therapist for 63 candidates under (DDU-GKY).

Certificate Distribution program to Old GDA batch (DDU-GKY).

Soft Skills Training Certificate distribution to Prisoners of Palara Special Jail.

Guest lecture on **" Tally: Older vs New" & " Concept of Emerging E-way Bill"**

total 100 Candidate had attend Guest Lecture.

Nakhatrana CSR

CSR activities being executed for the holistic development of eight most effected villages. in four core area Education, health, SLD and CID

.

- Carried out Survey of Widow women for Gov Pension scheme. There are Total 246 widow women among them 121 have been facilitated with Widow pension scheme@ Rs.1250/Month i.e. Rs.121250 /Month.
- To increase the ground water table we have started Ground water Recharging activity.Total 22 Bore well have been recharged at Ugedi and Deshalpar Villages.
- Repairing of Four Old check dam ,two pond have been deepen in Ugedi Village.
- World Environment day celebration on 5th June by tree Plantation at Jinjay & Ugedi Villages.
- Tree Plantation at Ugedi primary School with nurturing responsibility over Students **one Tree one Child.**
- Respected Gautam sir Birthday celebration with Tree Plantation at Ugedi schools.
- Adani Foundation day celebration at Deshpar –Gantuli Wiodw pension Government scheme form filling and brief about adani foundation activities.
- Mangoes sapling have been Given to Farmers and aware and awake about the important of Horticulture Cropping to doubling the farmer Income. 1000 Mangoes Sapling had been Distributed to Ugedi and Deshalpar Villages Farmers Accordingly.

Sr. No	Village Name	Total Widow woman	Eligible for Pension scheme	Total remaining	Facilitated Through AF
1	Ratdiya	45	27	18	26
2	Ugedi	42	36	6	19
3	Amara	43	17	26	17
4	Deshalpar (G)	69	44	25	39
5	Jinjay	25	18	7	12
6	Dhamay Navi	13	5	8	5
7	Dhamay Juni	9	3	6	3
Total		246	150	96	121

Nakhatrana CSR

- Under Utthan project total 8 schools and 1165 students are getting benefit since two years
- Even though the covid pendamic Uthhan education is ongoing with innovative teaching method.
    - **Online Outreach- Students-375**
    - **Individual Home visit-138**
    - **Sheri sikshan and school students- 313**
- Apart from regular classes Utthan Sahayks conducted online Covid awareness session. In which 100+ students and 80+ mothers took participate
- Utthan Sahayks approached Virtual classes for progressive learner before 9:00 am and after 8:30 pm.
- 21 students have been coached guided for National Means cum Merit Cum Scholarship Scheme (NMMS).
- Mothers Day Celebration and sensitized about how they are key point for their family growth. Total 350 mothers were participated
- International Yoga Day celebration on 21st June Through Virtually and Physically. More than 100 Family had participated
- More than 504 Mother were informed and awaked durinh mother meeting in Utthan Villages and aware about their wards education progress Health ,Hygine.
- Capacity building program for Utthan Sahayaks and Government Officers.
- Celebrated 75th Independence day with Commemorate 75 untold story , A Freedom Fighters who paid remarkable contribution for Indian Independence. And 139 Utthan school students and 53 parents had participated in Rashtragaan ,an initiative by the Ministry of Culture to Mark Azadi ka Amrit Mahotsav.
- Rakhi festival Students made Eco friendly Rakhi and tied to the 108 Frontline corona warriors.
- Arranged Virtual Tour on Plastic Waste Management with Municipal Corporation, Surat 73 Students were participated for the same.
- Teacher day celebration by preparing gratitude wall with card at 08 Utthan schools.
- D- Talks are an Initiative of Global Dream, a Disruptive Movement for Universal Foundational Literacy and Numera. Mr. Jatin Upadhayay Talk On "Empowering the Marginalized Communities in Gujarat Through rejuvenating Education.
- World Bool day celebration and started issue our library corner Books ,297 Books were issued by 6 to 9 standard students through our Library corner initiative which promted them for reading nd created curiosity to know more.
- Teacher day celebration by preparing gratitude wall with card at all 08 schools.
- 25 Students are being taught for Javahar Navoday Entrance Exam by Utthan Sahayak since last Three Month.

Tuna CSR



CSR activities being executed for the holistic development of three most effected villages and two fisherfolk settlement AKBTPL, Tuna.

We are Providing sage and clean potable water to Vira and Ghavarvado Fishermen vasahat and Vandi Village.
Total 11310 KL water was supplied by coordination with GWIL.

Two Pond Deepening at at Rampar Village and Community training center construction at Vandi Village.

Tree Plantation at Rampar primary School with **one Tree one Child concept to Nurturing Environment. 500+ trees planted**

Fodder distribution to Rampar and Tuna Villages.
Green Fodder -720310Kg
Dry Fodder -26680Kg Green.

Bitta CSR

Under Adani Solar Limited – 40 MW Solar Panel Power Unit is Situated at Bitta Village in Abdasa Taluka. We have done various activity under the CSR work.

As Abdasa is water scared region awareness for water conservation was provided to 50+ farmers of Bitta, Dhrufi and Moti Dhrufi villages.

Cleanliness of village Pond inlet in the Bita Village which lead more storage capacity and Village. Pond bunding construction in Dhufi village.

Panchayat Building construction was carried out by Adani Foundation's support and technical guidance.

Drainage line maintenance and Cleanliness is frequently done in Bita which lead Swachh Village

Dignity of Work Force Programme - EVP

Presently in Mundra Population of migrated labour community is increasing. Some of them are living in pathetic condition due to lack of awareness and education. It is true that we cannot achieve our goal of development until we support to up bring lives of this community. Basic needs of this labour force needs to be address. In labour Vasahats they are not getting facility of health facilities, proper living condition, sanitation or proper living atmosphere. This leads to addiction and various diseases.

Under Employee Volunteering Programme, Adani Foundation employees are supporting to more than 800 students of Hindi Medium from workforce background.

Adani Foundation Medical officers are providing their services at Labour clinic at Every Saturday Sunday and covering more than 150 patients in a week.

Joy of giving week celebration is scheduled twice in a year. In June 2021, more than 7500+ cloth distribution to workforce families by Employees of Adani Group under EVP.

DE addiction Awareness Campaign is going on with "Prajapita Brahmakumaris" at Labour Vasahat Areas. This campaign has changed life of many labours. Cleanliness Drive is organized in May and August with Adani Willmar Limited at vasahat areas.

Rakshabandhan and Ashadhi bij celebration by Mundra Solar

Dignity of workforce programme is arranged by joing collaboration with Adani Wilmar Limited, APSEZ, labour contractor and leaders of union. adan

Dignity of Work Force Programme - EVP

India's National TB Elimination Programme (NTEP) aims to meet the ambitious goal, announced by the Honorable Prime Minister Shri. Narendra Modi, of ending the TB epidemic by 2025, five years ahead of the UN Sustainable Development Goals (SDG) of 2030. In response to this call, the Government of India and USAID jointly launched the Corporate TB pledge (CTP), in April 2019 to galvanise corporate support to end TB.
To continue the momentum and efforts, the USAID-supported iDEFEAT TB project, which is working towards institutional strengthening to accelerate actions for Tuberculosis (TB) and drug resistant TB (DR-TB) in India; was launched as USAID/India's flagship TB project. The project works in collaboration with the Central TB Division (CTD), Ministry of Health and Family Welfare (Mo HFW) of the Government of India across a network of diagnostic, treatment, and program management institutions.
The CTP secretariat, hosted at The Union under the iDEFEAT TB project, provides technical assistance to government and corporates to adapt, implement TB interventions, and guide corporate resources for TB and DR-TB care.
Early diagnostics and treatment initiation are key to saving lives and minimizing disease transmission. In 2019, India reached a milestone of 24 lakh notified cases in India, an increase of 12% compared with 2018. Even then, an estimated 5.4 lakh were 'missing' across India, a serious drawback to our TB elimination efforts as what is not measured is unlikely to be improved. Diagnostic delays are also prevalent in India, with studies indicating that these can be attributed to patients as well as health systems.

Adani foundation with APSEZ, APML, AWL and MSPVL HR department in coordination of FOKIA has launched cluster based screening program to eliminate TB in labours under Dignity of workforce program. Adani Ports and SEZ Limited has initiated screening with 2300 work force in first phase with target of screening more than 10,000 workforce of all group businesses and SEZ Industries.

USAID/India team including Director – Health Office has planned to visit Adani Foundation CSR Activities related to community health. He visited Adani Hospital, GKGH Hospital and related activities.

Success Stories : Stories of 9 Empowered Women of Mundra

Educating and investing in women and girls has a multiplier effect on productivity, efficiency and economic growth but economically strengthening women is not only a means by which to spur and sustain inclusive industrial development, it is also a matter of advancing women's human rights.

Success Stories

"Biogas asanje kutum jo hakdo sabhy j aay" (Homebiogas is our family member now) words by Gita Bharu sheda residing in Zarpara village. We get bio slurry which is golden material for growth and I am so happy to cook on gas flame !! Earlier we have to collect wood and 5 hours per day breathing carbon during cooking period..
We will create awareness of the same to other farmers also.

Jetbai Gadhvi residing in Bhorara, she is saying " Now rural women can enjoy a smoke free life and almost entirely freedom from firewood collection and management. We feel safer, healthier and less worried - now we have time for other activities.

Success Stories

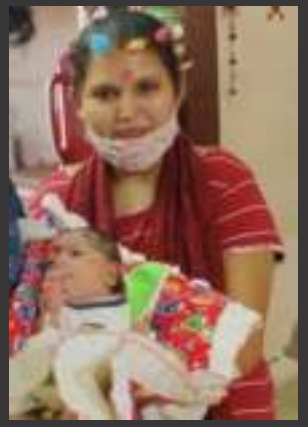
Valbai Sheda is residing at Zarpara village Prasla Vadi Vistar. She is Arts graduate and very much interested in developing various types of fodder. Having 5 cows and 2 buffalos, use of biogas since 4 years soil become fertile. She is developing Super Napier Bajra - NB21 and using chalf cutter for cutting it. She always use to make silage and cattle food with high protein.
With all experiments milk quality and also quantity increased by half ltr to one ltr per day per cow

Heerbai sodham residing at Nana kapaya who is progressive lady farmer. She lost her husband in 2015 in road accident. Responsibility of 4 children made her determined to earn for family. Her mother in law encouraged her for continue agriculture work. Her daughter is studying BSc nursing at Ahmedabad.
Since 3 years she is doing cow based natural farming. After knowing about homebiogas she approached Adani foundation and today on world environment day with her contribution installation carried out at her farm.
We salute her strong approach for natural farming and courage to take care of whole family with confidence

Success Stories

Gitaben is lady farmer doing natural farming at Bhorara Village. She is taking care of her dragon fruit farm having more than 3000 plants with zero chemicals. She is widow and having 3 children . Her daughter is civil engineer and helping her in cultivation.
When we meet her in month of March and offered our support – she told she just required guidance for jeevamrut and Gau Krupa Amrutam. She took part in "Kamlam" Exhibition at Ahmedabad. Adani Foundation salutes her confidence and self respect.

When a sweet little angel came into this world she was not at all aware about condition of her parents !!
Divyanen soni residing at Gandhidham was nine month pregnant, delivery date was having only 7 days time period.
In this happiness time - suddenly symptoms of corona appeared and corona test came out positive.
Her husband Nikunj soni inquired to many private hospital but nobody was ready to take responsibility of delivery of corona patient.
Finally the couple came to Adani GKGH hospital. Including corona treatment safe Delivery happened of patient - saved two lives !!
When divya ben left for home with a cute baby girl she said " Thanks word is very small for this nobel help - I got great gift of the God "



Success Stories

Ranjana ba is 28 years old lady lives in bhorara. She has 4 children. Her husband Raghuvirsinh lost his life before 3 months due to corona.
For Ranjan ba it was a very crucial time - socially and financially..
Jagrutiben meet her n fill forms of bal sanrakshan for 4 children. She will start getting 2000 per child - Rs 8000 per month from GOG. This support will be blessings for her.

Diwali Ben Parmar age 62 Years living at Mundra. Her name is totally opposite to her personality - she is 100 percent blind. With help of karsanbhai she started getting Niradhar vriddh pension Rs 750 per month as well as she received bus pass today. We can see her blessings by her innocent smile..

Success Stories

"if you are planning for one year grow crops, if you are planning for 10 years grow the fruit saplings, but if your planning is for 100 years grow education" – this is a well-known proverb. It is not that person does not know about education but when a person has to make choice of education v/s hunger the later one wins the battle. Dearth for education burns to extinguish fire of hunger.

The war of Education v/s hunger was the same in the house of Haribhai Khetshi Sheda a resident of Zarpara Village of Mundra. The couple Haribhai Sheda has 7 daughters and 5 sons was earning livelihood through grazing animals, working in others farm, and trying to grow something in his own farm with great difficulty. In the grave financial conditions there was no scope that children could be educated as all were occupied as child labourers and all gave priority to work as compared to education. But, story was different with the fourth child Nagajan Sheda. For him detection of polio followed by permanent defect in leg due to doctors fault turned as a blessing in disguise as he completed education till class 9 and dropped out after failing in class 10.

In 1991, when Adani Company started Mr Nagajan got labour work from a contractor. His first marriage had failed but was comfortable with the second wife. His first daughter from first marriage was Jyoti. He tried to give her best of childhood. He took an oath to educate the daughter by any means and make her doctor. It was his burning desire to see the upcoming generation of Charan samaj educated. He determined to do anything to have the tag of Dr. for his daughter.

Mr Nagajan started a tea stall for the people coming to work at Adani Port. But too bad of his fate nobody turned up for 08 days as he was using cow and buffalos milk and not of the packet. He didn't have enough fund to invest for the same. Meanwhile one contractor came with 50 labourers to do some civil work and they all started coming to his tea stall. Gradually, he borrowed 5000 rupees to bring things for the shop and also took the franchisee for Amul. He admitted Jyoti in the govt school of Dhrub. The family of Nagajanbhai also got two more sons and a daughter.

In order to fulfill his desire Nagajanbhai started searching for a good school in nearby area and narrowed down to Adani Public School, CBSE school. The family members opposed for the same as it would increase the expense for all. He was firm and said " I will eat chapatti and salt but will educate my daughter".

Success Stories

Jyoti was admitted in the school in Jr.Kg. The teachers of the school could understand the passion of the parent and her journey in APS started which was followed by her 03 siblings joining her in the same school.

Inspite of distance, different timings of all the section Mr Nagajan use to meticulously do pickup and drop for all the children. His wife supported him by doing all the household chores on her own, managing livestock and farm to earn some amount.

Time flied and Ms Jyoti secured 92% in Class 12 Science. The first target of Mr Nagajan was achieved. He received great appreciation and could set an example for his community. At present his two sons Rudra and Shivam are in 11th and 7th respectively and daughter Sonal is in class 9. It is not been an easy task to regularly pay fees of 04 kids. Yet he managed to do so. At times he has become fee defaulter which created various issues like result on hold etc. At one point of time he sold his plot and paid fees. His all the four children are good at studies and other co-curricular activities. Jyoti has got first position in district level throw ball, has got the best school award in swachagraha, gave a speech on kargil day and many others.

Jyoti is firm to fullfil the dream of her parents. She is able to drive vehicles like bolero, bike and grows different plants.

In the community of Nagajan Bhai early marriages are still prevalent. But, he has not done so for any of his kids. Nagajan bhai has proved to be a living example that if one decides he could achieve anything be it education of kids or their bright future.

Our country needs many such Nagajan bhai to have many Jyoti's!!!!

Events

Inauguration of **Community Resource Centre on 3rd April** to bridge the gap between Government and community to facilitate government schemes with Launching of "Super 51" Book Let by auspicious presence of Respected DM kutchh Ms.Pravina D K - IAS, District Development Officer Mr Bhavya Verma - IAS, Director, DRDA Mr Joshi , Director- Social welfare office Mr Arvind Rohadiya, Mr Chaudhary Sub Divisional Magistrate.

All dignitaries has visited Sanitary pad making unit and discussed with Saheli group women regarding orders and capacity. Pravina D K mam meet all women groups and asked NRLM department to prepare empowerment plan for the SHG's.

Events

❖ **Super specialist health camps**

With Joint Collaboration of Adani Foundation, Adani Hospital Mundra & Sterling Ramakrishna Hospital Gandhidham at Adani Hospital Mundra on 26th August. With availability of **Dr. Ankur Gupta** (Neuro & spine surgeon**), Dr. Tausif Sauravardi** (Pulmonologist), **Dr. Gautam Pipara** (Urologist), **Dr. Kunal Thakkar** (Endocrinologist) form Sterling Ramakrishna Hospital Gandhidham render their services accordingly.

With Joint Collaboration of Adani Foundation, Adani Hospital Mundra & Sterling Ramakrishna Hospital Gandhidham at Rotary hall on 28th September. **Dr. Ankur Gupta** (Neuro & spine surgeon**), Dr. Tausif Sauravardi** (Pulmonologist), **Dr. Gautam Pipara** (Urologist), **Dr. Kunal Thakkar** (Endocrinologist) Dr. Sachin Patel (MD), Dr. Rajesh Shukla (Surgeon) and Dr. Treyank Shukla (Pediatrician) had provided their services

Total 961 **Patients** had benefitted.

Doctor's Day Celebration

Kutch Kalpataru farmer producer organization is working for promoting dates of Kutch. On the occasion of Doctor day on 1ST July , KKPC Farmers honored Doctor, Nurses and House keeping staff of GKGH,Bhuj & AHMPUL,Mundra with great respect to paid theirs sincere contribution during Covid -19 Pandemic.

On this day all Directors of KKPC were remain present and facilitate all medical staff with dates packet. More than 800 Staff members have been facilitated with the same.

This shows great feelings of farmers towards remarkable work of Adani healthcare in pandemic condition at Mundra and Bhuj Hospital.

Events

We **celebrated 25th Silver Jubilee of Adani Foundation** at Adani House Mundra. On this Auspious day We facilitated 11 women of Mundra Villages who have done Remarkable work in their filed in the Presence of EDM Shree Rakshit sir and HOD of APSEZ. acquainted about Adani Foundation Journey.

As well as Appointment letter Felicitated to Mamd Shakil Manjaliya, a First Fisher Youth who have peruse Mechanical Diploma

On the occasion of **Respected Dr. Pritiben Birthday** at 29th August, 21 Ration kit were distributed by APSEZ & AWL Employee To needy widow and senior citizen Women who are alone & passing measurable life

As well as ensure to continue ration kit support for life long to them.

Events

World Environment Day Celebration

Miyawaki forest development inauguration was held in coordination with Gram Panchayat, Forest Department and Mnrega. Additional collector, Sub division Magistrate, Range forest officer, TDO, Head environment, Panchayat members and Talati remained present. Press media was also live in this virtual event. Executive Director Mr. V. S. Gadhvi had given motivational speech on the occasion.
MOU signing ceremony for promotion of Natural farming with KSKV kutchh University. Dr.Jayrajsinh Jadeja vice chancellor and Dr.Mrugesh trivdi HOD of earth and environmental science were present and discussed about the road map for involving more than 2000 farmers for natural farming

International Coastal Clean up Day

Adani foundation MUNDRA has celebrated International Coastal Clean up Day with Coast Guard" with theme swachhagraha.. School students, Coast Guard staff and Adani foundation staff had cleaned Mandvi beach and give a message of swachhagraha.. In this event more than 150 students and 120 staff members of coast guard and Adani Foundation had taken part

Visits

- **ESG team** of Adani Group had visited AF Mundra - sustainable Project & business
- **Adani Foundation COO**, Respected Chandrasekhar Gowda sir-COO Adani Foundation had visit of all AF Project Mundra.
- **Adani Digital Lab & AF Communication Team**, had visit all AF Project Mundra.
- **MOEF team** had visit about APSEZ & AF Sustainability Projects.
- **EDI -Entrepreneurship Development Institute Team** had visit to frame out sustainable SHG development Project
- Gujrat Ecology Commission has visited grassland development project
- **100 VVIP Investor had Visit** APSEZ ,Mundra as well as Briefed about CSR activities and Gifted with NAMDA Frame which is unique combination to Revival of NAMDA craft and Mangrove Bio diversity- Fauna.

Mapping AF Projects with Sustainable Development Goals...

Sr No	UN-Sustainable Development Goals	Illustrative Mapping of Mundra Projects
1	No Poverty	Support to Farmers, Fishermen and Locals, Adani Skill Development Centre (ASDC)
2	Zero Hunger	Natural Farming, Drip Irrigation Project, Dragon Fruit Farming, Date Tissue Culture
3	Good Health & Well-being	Gujarat Adani Institute of Medical Sciences (GAIMS), Health Clinics, Mobile Health Vans
4	Quality Education	Adani Vidya Mandir, GAIMS & ASDC
5	Gender Equality	Co-education in Adani Vidya Mandir & ASDC, Saheli Samitis, Support to Women Farmers
6	Clean Water & Sanitization	Water Conservation Projects, Potable Water to Fishermen
7	Affordable & Clean Energy	Usage of Solar Energy, Promotion of Bio-Gas Plants
8	Decent Work & Economic Growth	ASDC, Self Help Groups (SHG), Local Arts Revival
9	Industry, innovation & infrastructure	Tissue Culture, Seaweed Culture, Local Arts Revival
10	Reduced Inequalities	SHGs, Local CSR Leadership
11	Sustainable Cities & Communities	Community Infrastructure, Smriti Van
12	Responsible Consumption & Production	Usage of Solar Energy, Natural Farming
13	Climate Action	Mangroves Conservation, Biodiversity, Water Conservation, Seaweed Culture
14	Life below Water	Mangroves Conservation, Seaweed Culture
15	Life on Land	Mangroves Conservation, Smriti Van, Animal Husbandry
16	Peace, Justice & Strong Institutions	Local CSR Leadership, Self-sustained Open Structures
17	Partnerships for Goals	Revival of Local Arts, Smriti Van, Project Swavalamban, Seaweed Culture

Stories of change - impact in numbers...

175+

Hectares of Land Luni Mangroves Biodivesity

5820+

Fisherman person days employed in Mangroves Plantation

41000+

Plantations at Smriti Van of **115 varieties**

950+

Beneficiaries of multispecialty health camp

500+

Students at Adani Vidya Mandir

8900+

Beneficiaries of Health Initiatives

15

SHGs under 'Saheli' initiative for Women

121

Home Biogas Plants installed in 5+ villages

8700+

Special health care for Sr Citizens in **68 Villages**

1632+

Beneficiaries enrolled in Govt Schemes in FY21

20

Check Dams constructed and rejuvenated

5000+

Students under Utthan initiative in **39 Schools**

Summary - Budget Utilization of six month F.Y. 2021-2022

Sr No	Particulars	Approved Budget	Budget Utilization	% of utilization
A.	General Management and Administration	76.12	23.67	31.10%
B.	Education	172.05	18.07	10.50%
B1	Utthan-Education -Mundra & Anjar	149.51	16.91	11.31%
B2	Utthan : Fisherfolk	22.54	1.16	5.14%
C.	Community Health	330.38	107.47	32.53%
D.	Sustainable Livelihood Development	426.28	171.64	40.26%
E.	Community Infrastructure Development	141.35	11.18	7.91%
F.	EDM Recommended Projects	100.00	2.65	2.65%
G.	COVID 19 Support	25.00	12.16	48.63%
	Total AF CSR Budget :	1,271.18	346.84	27.28%
[I]	Adani Vidya Mandir-Bhadreshwar	189.84	40.41	21.28%
[II]	Project Udaan-Mundra	167.42	17.99	10.75%
	GRAND TOTAL Budget F.Y. 2021-22 :	1,628.45	405.24	24.89%

Media coverage


અદાણી ફાઉન્ડેશન દ્વારા નાના કપાયા ખાતે ગાઢ જંગલ ઊભું કરાશે


કચ્છ પત્રિકા
અદાણી ફાઉન્ડેશન અને તાલુકા હેલ્થ ઓફીસના સંયુક્ત ઉપક્રમે "ટી.બી.હારેગા દેશ જીતેગા" અંતર્ગત કાર્યક્રમ યોજાયો


કોરોનાકાળમાં મહિલાઓએ મેળવી રોજગારી


માછીમારનો દીકરો મિકેનિકલ એન્જિનીયર બન્યો, મોટી કંપનીમાં નોકરી પણ મળી


adani Foundation
અદાણી ફાઉન્ડેશનનો મંત્ર : સેવાનું ઉત્તરદાયિત્વ
મુંદરા એસઇઝેડ ઔદ્યોગિક વિવિધતાની ઓળખ


કચ્છ પત્રિકા
"શાળા બંધ પણ શિક્ષણ નહિ"
અદાણી વિદ્યા મંદિર , ભદ્રેશ્વર દ્વારા અંતરિયાળ ગામોમાં શેરી શિક્ષણ શરૂ કરાવ્યું


મુંદરામાં કોમ્યુનિટી રિસોર્સ સેન્ટરનો કરાયેલો પ્રારંભ


મુન્દ્રાની અદાણી હોસ્પિટલમાં કોરોના પોઝિટીવ દર્દીઓની કરાતી સેવા-ચાકરી

Adani Foundation Kutch

Thank You

Annexure – 2

LEGAL MATTERS – APSEZ, Mundra

1. **Case No**: CA 9124 of 2011
Case Name: Kheti Vikas Seva Trust Vs UoI & Others
Name of the Court: Gujarat High Court
Orders/directions of the Court, if any and its relevance with the proposed project:

- The writ petition has been dismissed by the Gujarat High Court on 17th April 2015.
- The Hon'ble Supreme Court of India on 18.3.2016 dismissed the appeal against the said order dated 17th April, 2015 of the Gujarat High Court.
- However, an application filed by the petitioner alleging non-compliance of an order of the Gujarat HC dated 12th July 2011 prohibiting the cutting of mangroves and other forests during the pendency of the petition without permission of the state forest and environment department in relation to the writ petition is still pending.

2. **Case No**: SLP 28788 of 2016
Case Name: Pravinsinh Bhurabhai Chauhan Vs State of Gujarat & Others
Name of the Court: Supreme Court
Orders/directions of the Court, if any and its relevance with the proposed project:

- In view of the affidavits filed by MOEF, and Govt of Gujarat the High Court dismissed the petition on 18.2.2015.
- The petitioner filed a special leave to appeal before the Supreme Court of India, challenging the order dated 18.2.2015 of Gujarat High Court and the same is pending. Sunita Narayan committee was appointed to study the area. Report was prepared by committee and submitted to Hon'ble Supreme Court.
- Matter pending at Supreme court.

3. **Case No**: R/SPECIAL CIVIL APPLICATION NO. 5509 of 2019
Case Name: Jusab Kasam Manjaliya Vs Union of India
Name of the Court: Gujarat High Court

- In compliance of the order of the Hon'ble HIGH COURT of Gujarat vide letter dated 22nd Aug. 2019 directed MoEF&CC, RO Bhopal to conduct a site visit of area in and Adani Ports & Special economic Zone Mundra Kutch. Accordingly, MoEF&CC, RO Bhopal communicated the dates of the site visit (i.e., Sep 3 & 4, 2019).
- In accordance with the above-cited directions/communications, a site visit to the Adani Ports & Special economic Zone Mundra and subsidence areas pointed earlier by the appellant was undertaken during Sep 3-4, 2019 by Dr. HVC Cherry (Scientist D), Regional Office MOEF&CC Bhopal.
- Matter pending at High court.

Annexure – 3

Details of Greenbelt Development at APSEZ, Mundra

Total Green Zone Detail Till Up to Sep – 2021					
LOCATION	**Area (In Ha.)**	**Trees (Nos.)**	**Palm (Nos.)**	**Shrubs (SQM)**	**Lawn (SQM)**
SV COLONY	71.66	34920	7962	69696.00	100646.00
PORT & NON SEZ	81.61	149359	19220	75061.78	62966.38
SEZ	116.60	227120	20489	220583.60	28162.03
MITAP	2.52	8168	33	3340.00	4036.00
WEST PORT	109.37	256552	70831	24612.00	22854.15
AGRI PARK	8.94	17244	1332	5400.00	2121.44
SOUTH PORT	14.45	27530	3470	3882.00	3327.26
Samudra Township	57.27	63722	11834	23908.89	47520.07
Productive Farming (Vadala Farm)	23.79	27976	--	--	--
TOTAL (APSEZL)	**486.19**	**8,12,591**	**1,35,171**	**426484.27**	**271633.33**
		Total Saplings: 9,47,762 Nos.			

Details of Mangrove Afforestation done by APSEZ

Sl. no.	Location	District	Area (Ha)	Duration	Species	Implementation agency
1	Mundra Port	Kutch	24	-	Avicennia marina	Dr. Maity, Mangrove consultant of India
2	Mundra Port	Kutch	25	-	Avicennia marina	Dr. Maity, Mangrove consultant of India
3	Luni/Hamirmora (Mundra,)	Kutch	160.8	2007 - 2015	Avicennia marina, Rhizophora mucronata, Ceriops tagal	GUIDE, Bhuj
4	Kukadsar (Mundra)	Kutch	66.5	2012 - 2014	Avicennia marina	GUIDE, Bhuj
5	Forest Area (Mundra)	Kutch	298	2011 - 2013	Avicennia marina	Forest Dept, Bhuj
6	Jangi Village (Bhachau)	Kutch	50	2012 - 2014	Avicennia marina	GUIDE, Bhuj
7	Jakhau Village (Abdasa)	Kutch	310.6	2007-08 & 2011-13	Avicennia marina, Rhizophora mucronata, Ceriops tagal	GUIDE, Bhuj
8	Sat Saida Bet	Kutch	255	2014-15 & 2016-17	Avicennia marina & Bio diversity	GUIDE, Bhuj
9	Dandi Village	Navsari	800	2006 - 2011	Avicennia marina, Rhizophora mucronata, Ceriops tagal	GEC, Gandhinagar
10	Talaja Village	Bhavnagar	50	2011-12	Avicennia marina	Forest Dept, Talaja
11	Narmada Village	Bhavnagar	250	2014 - 2015	Avicennia marina	GEC, Gandhinagar
12	Malpur Village	Bharuch	200	2012-14	Avicennia marina	SAVE, Ahmedabad
13	Kantiyajal Village	Bharuch	50	2014-15	Avicennia marina	SAVE, Ahmedabad
14	Devla Village	Bharuch	150	210-16	Avicennia marina	SAVE, Ahmedabad
15	Village Tala Talav (Khambhat)	Anand	100	2015 - 2016	Avicennia marina	SAVE, Ahmedabad
16	Village Tala Talav (Khambhat)	Anand	38	2015 - 2016	Avicennia marina	GEC, Gandhinagar
17	Aliya Bet, Village Katpor (Hansot)	Bharuch	62	2017-18	Avicennia marina & Rhizophora spp.	GEC, Gandhinagar
Total			**2889.9**			

Annexure – 4

"HALF YEARLYENVIRONMENTAL MONITORING REPORT"

FOR

ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED
TAL: MUNDRA, KUTCH, MUNDRA – 370 421

MONITORING PERIOD:
APRIL 2021 TO SEPTEMBER 2021

PREPARED BY:

POLLUCON LABORATORIES PVT.LTD.

**PLOT NO.5/6 "POLLUCON HOUSE", OPP. BALAJI INDUSTRIAL SOCIETY,
OLD SHANTINATH SILK MILL LANE, NEAR GAYTRI FARSAN MART,
NAVJIVAN CIRCLE, UDHANA MAGDALLA ROAD, SURAT-395007.
PHONE/FAX – (+91 261) 2455 751, 2601 106, 2601 224.
E-mail: pollucon@gmail.comweb: www.polluconlab.com**

TC - 5945 **ISO 9001:2015** **ISO 14001:2015** **ISO45001:2018**

MARINE WATER MONITORING SUMMARY REPORT

RESULTS OF MARINE WATER [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.41	8.35	8.32	8.25	8.27	8.21	8.24	8.31	8.17	8.12	8.13	8.09	IS3025(P11)83Re.02
2	Temperature	oC	30.7	30.5	30.5	30.1	30.2	30	29.5	29.3	29.9	29.8	29.9	29.7	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	102	88	119	102	127	108	107	92	113	102	93	85	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	5.0	Not Detected	4.2	Not Detected	3.4	Not Detected	3.1	Not Detected	2.8	Not Detected	2.3	Not Detected	IS 3025 (P44)1993Re.03Edition2.1
5	Dissolved Oxygen	mg/L	6.0	5.8	5.9	5.8	6.0	5.8	5.9	5.7	6.0	5.8	6.0	5.95	IS3025(P38)89Re.99
6	Salinity	ppt	37.1	37.4	36.2	36.7	35.2	35.6	35.72	36.18	35.14	35.46	34.90	35.32	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22nd Edi)5520 D
8	Nitrate as NO_3	µmol/L	2.21	2.40	2.98	2.75	2.54	2.39	2.86	2.74	2.36	2.14	2.17	2.06	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	0.75	0.81	0.83	0.79	0.35	0.46	0.92	0.81	0.75	0.63	0.63	0.54	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	2.90	2.72	2.76	2.51	2.13	1.97	2.35	2.16	2.59	2.48	2.38	2.13	IS3025(P34)88Cla.2.3
11	Phosphates as PO_4	µmol/L	2.58	2.04	1.93	1.72	2.64	2.48	1.97	1.83	2.28	2.19	2.46	2.35	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	5.86	5.93	6.57	6.05	5.02	4.82	6.13	5.71	5.70	5.25	5.18	4.73	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	8.0	Not Detected	14.0	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	38712	38901	37804	38216	36809	37118	36802	37184	36758	37066	35994	36384	IS3025(P16)84Re.02
15	COD	mg/L	20	Not Detected	23.6	19.8	21.6	Not Detected	15.4	Not Detected	12.9	10.8	10.28	Not Detected	APHA(22nd Edi) 5520-D Open Reflux
A	**Phytoplankton**														
16.1	Chlorophyll	mg/m^3	2.62	2.25	2.59	2.20	2.67	2.25	2.21	2.16	2.18	2.13	2.23	2.12	APHA (22nd Edi) 10200-H

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

16.2	Phaeophytin	mg/m^3	0.15	0.32	0.18	0.38	0.1	0.3	0.36	0.60	0.59	0.44	0.54	0.46	APHA (22nd Edi) 10200-H
16.3	Cell Count	No. x 10^3/L	162	96	150	94	146	102	124	94	156	106	142	96	APHA (22nd Edi) 10200-H
16.4	Name of Group Number and name of group species of each group	--	*Biddulphia sp .Cheatoceros sp. Skeletonema sp. Rhizosolenia sp.*	*Nitzschia sp. Stauroneis sp. Navicula sp.*	*Rhizosolenia sp. Stauroneis sp. Pleurosigma sp. Coscinodiscus sp.*	*Navicula sp. Skeletonema sp. Nitzschia sp.*	*Thallasiosira sp. Cheatoceros sp. Skeletonema sp. Thallasionema sp.*	*Nitzschia sp. Navicula sp. Melosira sp. Synedra sp.*	*Ceratium sp. Pleurosigma sp. Rhizosolenia sp. Mastogloia sp. Thallasionema sp.*	*Synedra sp. Nitzschia sp. Cyclotella sp. Melosira sp.*	*Skeletonema sp. Rhizosolenia sp. Coscinodiscus sp. Thallasionema sp.*	*Navicula sp. Nitzschia sp. Cyclotella sp. Melosira sp.*	*Chaetoceros sp. Coscinodiscus sp. Biddulphia sp. Skeletonema sp.*	*Rhizosolenia sp. Pleurosigma sp. Navicula sp. Synedra sp.*	APHA (22nd Edi) 10200-H
B	**Zooplanktons**														
17.1	Abundance (Population)	noX10^3/ 100 m^3	24		22		32		27		33		25		APHA (22nd Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Chaetognathes Polychaetes Amphipods Decapods		Copepods Isopods Polychaetes Namatodes		Copepods Polychaetes Decapods Ostracods		Bivalves Gastropods Polychaetes		Decapods Gastropods Polychaetes		Polychaetes Lamellibranches Gastropods Ostracods		APHA (22nd Edi) 10200-G
17.3	Total Biomass	ml/100 m^3	2.1		1.9		2.25		2.4		3.1		2.45		APHA (22nd Edi) 10200-G
C	**Microbiological Parameters**														
18.1	Total Bacterial Count	CFU/ml	2410		2320		2540		2550		2610		2740		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present		APHA(22nd Edi)9221-D
18.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi.2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

H. T. Shah

Lab Manager

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Dr. ArunBajpai

Lab Manager (Q)

RESULTS OF SEDIMENT ANALYSIS [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021	MAY 2021	JUNE 2021	JULY 2021	AUGUST 2021	SEPTEMBER 2021	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.63	0.52	0.48	0.43	0.39	0.42	FCO:2007
2	Phosphorus as P	µg/g	529	463	593	528	613	574	APHA(22nd Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
5	**Heavy Metals**								
5.1	Aluminum as Al	%	5.59	4.26	4.87	4.37	4.56	4.98	AAS APHA 3111 B
5.2	Total Chromium as Cr^{+3}	µg/g	128	110	126	109	127	112	AAS 3111B
5.3	Manganese as Mn	µg/g	716	673	706	684	639	728	AAS APHA 3111 B
5.4	Iron as Fe	%	4.93	4.39	4.68	4.47	4.61	4.76	AAS APHA(22nd Edi)3111 B
5.5	Nickel as Ni	µg/g	57	31.72	39.5	29.84	33.58	28.64	AAS APHA(22nd Edi)3111 B
5.6	Copper as Cu	µg/g	48	28.6	42.6	32.6	49.8	46.70	AAS APHA(22nd Edi)3111 B
5.7	Zinc as Zn	µg/g	135	107	113	97.5	110	92.70	AAS APHA(22nd Edi)3111 B
5.8	Lead as Pb	µg/g	2.76	3.28	2.59	3.16	2.68	2.38	AAS APHA(22nd Edi)3111 B
5.9	Mercury as Hg	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	AAS APHA- 3112 B
6	**Benthic Organisms**								
6.1	Macrobenthos	--	Polychaetes Ostracods Gastropods	Polychaetes Amphipods Gastropods	Polychaetes Amphipods Branchyarans	Gastropods Crustaceans Decapods	Gastropods Crustaceans Bivalves	Gastropods Polychaetes Bivalves	APHA (22nd Edi) 10500-C
6.2	MeioBenthos	--	Foraminiferans Nematodes	Foraminiferams	Nematodes	Foraminiferams Nematodes	Foraminiferams	Nematodes	APHA (22nd Edi) 10500-C
6.3	Population	no/m2	379	262	350	440	352	499	APHA (22nd Edi) 10500-C

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

RESULTS OF MARINE WATER [M2 MOUTH OF BOCHA & NAVINAL CREEK - N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.39	8.37	8.32	8.25	8.23	8.17	8.17	8.14	8.13	8.09	8.09	8.04	IS3025(P11)83Re.02
2	Temperature	oC	30.9	30.8	30.8	30.6	30.2	30.1	29.6	29.3	29.9	29.8	29.8	29.7	IS3025(P9)84 Re.02
3	Total Suspended Solids	mg/L	109	124	123	107	135	119	123	107	113	102	102	91	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	3.0	Not Detected	3.5	Not Detected	3.2	Not Detected	3.0	Not Detected	2.8	Not Detected	2.3	Not Detected	IS 3025 (P44)1993Re. 03Edition2.1
5	Dissolved Oxygen	mg/L	5.9	5.7	5.9	5.8	6.0	5.9	5.9	5.7	6.0	5.7	6.0	5.8	IS3025(P38)89Re.99
6	Salinity	ppt	37	37.3	37.2	37.5	35.3	35.5	35.46	35.92	35.26	35.74	34.86	35.2	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22nd Edi) 5520D
8	Nitrate as NO_3	µmol/L	2.56	2.74	2.96	2.63	2.61	2.42	2.37	2.19	2.47	2.39	2.53	2.41	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	0.65	0.74	0.75	0.51	0.45	0.56	0.89	0.75	0.76	0.68	0.81	0.73	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	2.45	2.80	2.34	2.24	2.51	2.34	2.38	2.23	2.57	2.41	2.34	2.19	IS3025(P34)88Cla.2.3
11	Phosphates as PO_4	µmol/L	2.71	2.49	2.69	2.47	2.37	2.28	1.75	1.68	1.36	1.27	1.75	1.63	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	5.66	5.49	6.05	5.38	5.57	5.32	5.64	5.17	5.80	5.48	5.68	5.33	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	6.0	Not Detected	10.5	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	38544	38675	38664	38926	36898	37104	37066	37504	36862	37314	35964	36276	IS3025(P16)84Re.02
15	COD	mg/L	14	8	21.7	19.3	19.4	Not Detected	16.2	Not Detected	13.4	12.8	10.48	Not Detected	APHA(22nd Edi) 5520-D Open Reflux
A	**Phytoplankton**														
16.1	Chlorophyll	mg/m^3	2.71	2.63	2.65	2.49	2.58	2.4	2.37	2.29	2.26	2.18	2.24	2.16	APHA (22nd Edi) 10200-H

H. T. Shah

Lab Manager

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Dr. ArunBajpai

Lab Manager (Q)

16.2	Phaeophytin	mg/m^3	0.99	0.19	1.04	0.33	0.2	1.3	0.45	1.40	0.65	1.51	0.67	1.54	APHA (22nd Edi) 10200-H
16.3	Cell Count	No. x 10^3/L	156	95	142	86	152	106	134	99	152	106	138	108	APHA (22nd Edi) 10200-H
16.4	Name of Group Number and name of group species of each group	--	Rhizosolenia sp. Biddulphia sp. Thallasiosira sp. Coscinodiscus sp.	Synedra sp. Nitzschia sp. Pleurosigma sp.	Thallasionema sp. Pleurosigma sp. Biddulphia sp.	Navicula sp. Synedra sp. Cheatoceros sp.	Thallasionema sp. Cheatoceros sp. Biddulphia sp. Coscinodiscus sp.	Synedra sp. Navicula sp. Nitzschia sp. Pleurosigma sp.	Biddulphia sp. Stauroneis sp. Coscinodiscus sp. Skeletonema sp.	Navicula sp. Nitzschia sp. Cyclotella sp. Thalassiothrix sp.	Rhizosolenia sp. Synedra sp. Thallasionema sp. Pleurosigma sp. Coscinodiscus sp.	Thallasionema sp. Navicula sp. Skeletonema sp. Biddulphia sp.	Coscinodiscus sp. Biddulphia sp. Thallasionema sp. Rhizosolenia sp.	Synedra sp. Nitzschia sp. Navicula sp. Stauroneis sp.	APHA (22nd Edi) 10200-H
B	**Zooplanktons**														
17.1	Abundance (Population)	noX10^3 / 100 m^3	27		25		31		23		29		24		APHA (22nd Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Ostracods Gastropods Chaetognathes Polychaetes		Namatodes Copepods Polychaetes Mysids		Decapods Polychaetes Gastropods		Polychaetes Bivalves Decapods Ostracods		Polychaetes Bivalves Decapods Chaetognaths		Lamellibranches Polychaetes Gastropods		APHA (22nd Edi) 10200-G
17.3	Total Biomass	ml/100 m^3	2.6		2.2		2.35		2.2		2.9		2.15		APHA (22nd Edi) 10200-G
C	**Microbiological Parameters**														
18.1	Total Bacterial Count	CFU/ml	2240		2380		2450		2600		2580		2710		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present		APHA(22nd Edi) 9221-D
18.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981 Edi.2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

POLLUCON LABORATORIES PVT. LTD. SURAT-7

H. T. Shah

Lab Manager

Dr. ArunBajpai

Lab Manager (Q)

RESULTS OF SEDIMENT ANALYSIS [M2 MOUTH OF BOCHA & NAVINAL CREEK – N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021	MAY 2021	JUNE 2021	JULY 2021	AUGUST 2021	SEPTEMBER 2021	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	--	--	--	--	0.47	0.37	FCO:2007
2	Phosphorus as P	µg/g	--	--	--	--	619	568	APHA(22nd Edi) 4500 C
3	Texture	--	--	--	--	--	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	--	--	--	--	Not Detected	Not Detected	PLPL-TPH
5	**Heavy Metals**								
5.1	Aluminum as Al	%	--	--	--	--	4.78	4.88	AAS APHA 3111 B
5.2	Total Chromium as Cr+3	µg/g	--	--	--	--	169	152	AAS 3111B
5.3	Manganese as Mn	µg/g	--	--	--	--	852	783	AAS APHA 3111 B
5.4	Iron as Fe	%	--	--	--	--	4.8	4.72	AAS APHA(22nd Edi)3111 B
5.5	Nickel as Ni	µg/g	--	--	--	--	42.96	37.98	AAS APHA(22nd Edi)3111 B
5.6	Copper as Cu	µg/g	--	--	--	--	37.64	41.23	AAS APHA(22nd Edi)3111 B
5.7	Zinc as Zn	µg/g	--	--	--	--	152	139	AAS APHA(22nd Edi)3111 B
5.8	Lead as Pb	µg/g	--	--	--	--	2.75	1.86	AAS APHA(22nd Edi)3111 B
5.9	Mercury as Hg	µg/g	--	--	--	--	Not Detected	Not Detected	AAS APHA- 3112 B
6	**Benthic Organisms**								
6.1	Macrobenthos	--	--	--	--	--	Gastropods Polychaetes Crustaceans	Gastropods Polychaetes Crustaceans	APHA (22nd Edi) 10500-C
6.2	MeioBenthos	--	--	--	--	--	Nematodes	--	APHA (22nd Edi) 10500-C
6.3	Population	no/m^2	--	--	--	--	499	469	APHA (22nd Edi) 10500-C

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

RESULTS OF MARINE WATER [M3 EAST OF BOCHAISLAND - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.43	8.47	8.31	8.27	8.24	8.20	8.19	8.13	8.12	8.09	8.09	7.98	IS3025(P11)83Re.02
2	Temperature	oC	30.8	30.9	30.7	30.5	30.1	29.8	29.6	29.5	29.9	29.8	29.8	29.7	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	98	85	110	92	123	107	114	93	128	104	107	89	IS3025(P17)84Re.02
4	BOD (3 Days @ 27°C)	mg/L	4.0	Not Detected	3.6	Not Detected	3.4	Not Detected	3.2	Not Detected	2.8	Not Detected	2.3	Not Detected	IS 3025 (P44)1993Re.03Edition2.1
5	Dissolved Oxygen	mg/L	6.2	6	6.0	5.9	6.0	5.8	5.9	5.8	6.0	5.7	6.0	5.85	IS3025(P38)89Re.99
6	Salinity	ppt	36.9	37.3	37.1	37.4	35.3	35.6	35.74	36.18	35.14	35.89	35.24	35.76	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22nd Edi)5520D
8	Nitrate as NO_3	µmol/L	2.41	2.65	2.87	2.74	2.69	2.47	2.39	2.13	2.57	2.41	2.39	2.27	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	0.55	0.60	0.93	0.81	0.75	0.68	0.68	0.52	0.73	0.68	0.64	0.58	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	2.75	2.84	2.68	2.58	2.53	2.45	2.28	2.17	2.39	2.17	2.47	2.30	IS3025(P34)88Cla.2.3
11	Phosphates as PO_4	µmol/L	2.66	2.14	2.57	2.41	2.39	2.31	1.99	1.75	2.15	2.10	2.25	2.17	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	5.71	5.14	6.48	6.13	5.97	5.60	5.35	4.82	5.69	5.26	5.50	5.15	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	18.0	Not Detected	16.8	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	38241	38656	38558	38282	36894	37180	37312	37726	36748	37456	36318	36784	IS3025(P16)84Re.02
15	COD	mg/L	24	17	21.6	19.4	20.5	Not Detected	16.3	Not Detected	13.6	11.4	10.86	Not Detected	APHA(22nd Edi) 5520-D Open Reflux
A	**Phytoplankton**														
16.1	Chlorophyll	mg/m^3	2.87	2.34	2.71	2.29	2.61	2.34	2.33	2.25	2.26	2.10	2.34	2.27	APHA (22nd Edi) 10200-H
16.2	Phaeophytin	mg/m^3	0.12	0.16	0.39	0.22	0.5	0.2	0.77	0.26	0.83	0.40	0.14	0.80	APHA (22nd Edi) 10200-H
16.3	Cell Count	No. x 10^3/L	137	103	117	89	131	104	117	84	131	97	123	91	APHA (22nd Edi) 10200-H

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

16.4	Name of Group Number and name of group species of each group	--	Nitzschia sp. Pleurosigma sp. Biddulphia sp. Coscinodiscus sp.	Navicula sp. Stauroneis sp. Cheatoceros sp. Synedra sp.	Pleurosigma sp. Thallasiosira sp. Biddulphia sp. Rhizosolenia sp.	Cyclotella sp. Navicula sp. Nitzschia sp.	Skeletonema sp. Biddulphia sp. Coscinodiscus sp. Rhizosolenia sp.	Navicula sp. Nitzschia sp. Pleurosigma sp. Melosira sp.	Skeletonema sp. Biddulphia sp. Thallasionema sp. Coscinodiscus sp.	Nitzschia sp. Rhizosolenia sp. Synedra sp. Pleurosigma sp.	Nitzschia sp. Biddulphia sp. Skeletonema sp. Rhizosolenia sp.	Navicula sp. Pleurosigma sp. Synedra sp. Cheatoceros sp.	Gyro sigma sp. Guinardia sp. Thallasionema sp. Coscinodiscus sp. Cyclotella sp.	Nitzschia sp. Amphiprora sp. Biddulphia sp. Melosira sp. Synedra sp.	APHA (22nd Edi) 10200-H
B	**Zooplanktons**														
17.1	Abundance (Population)	noX10^3/ 100 m^3	28		26		30		25		31		26		APHA (22nd Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	DecapodsPolychaetesSiphonophores		ChaetognathesOstracods Gastropods		GastropodsPolychaetes DecapodsOstracods		PolychaetesDecapodsOstracodsAmphipods		Polychaetes Gastropods Decapods		Polychaetes GastropodsOstracods		APHA (22nd Edi) 10200-G
17.3	Total Biomass	ml/100 m^3	2.6		2.3		2.45		2.4		2.9		2.55		APHA (22nd Edi) 10200-G
C	**Microbiological Parameters**														
18.1	Total Bacterial Count	CFU/ml	2390		2450		2520		2320		2490		2640		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present		APHA(22ndEdi)9221-D
18.3	Ecoli	/ml	Present		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi.2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

RESULTS OF SEDIMENT ANALYSIS [M3 RIGHT SIDE OF BOCHA CREEK - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021	MAY 2021	JUNE 2021	JULY 2021	AUGUST 2021	SEPTEMBER 2021	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.56	0.47	0.43	0.42	0.37	0.35	FCO:2007
2	Phosphorus as P	µg/g	539	603	576	537	569	542	APHA(22nd Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
5	**Heavy Metals**								
5.1	Aluminum as Al	%	4.72	4.39	4.63	4.46	4.68	4.58	AAS APHA 3111 B
5.2	Total Chromium as Cr+3	µg/g	119	127	119	106	132	107	AAS 3111B
5.3	Manganese as Mn	µg/g	703	613	710	692	613	592	AAS APHA 3111 B
5.4	Iron as Fe	%	4.81	4.68	4.56	4.37	4.58	4.63	AAS APHA(22nd Edi)3111 B
5.5	Nickel as Ni	µg/g	63	35.7	39.28	35.6	31.24	41.28	AAS APHA(22nd Edi)3111 B
5.6	Copper as Cu	µg/g	40	32.6	42.5	37.48	41.98	36.7	AAS APHA(22nd Edi)3111 B
5.7	Zinc as Zn	µg/g	139	112	119	102	129	109	AAS APHA(22nd Edi)3111 B
5.8	Lead as Pb	µg/g	2.75	2.93	2.64	2.36	2.75	2.17	AAS APHA(22nd Edi)3111 B
5.9	Mercury as Hg	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	AAS APHA- 3112 B
6	**Benthic Organisms**								
6.1	Macrobenthos	--	Polychaetes Crustaceans Bivalves	Polychaetes Gastropods Crustaceans	Amphipods Polychaetes Crustaceans	Gastropods Polychaetes Bivalves	Crustaceans Polychaetes Bivalves	Gastropods Polychaetes Bivalves	APHA (22nd Edi) 10500-C
6.2	MeioBenthos	--	Nematodes Turbellaria	Namatodes	Namatodes	Foraminiferams	--	--	APHA (22nd Edi) 10500-C
6.3	Population	no/m^2	324	352	411	471	353	372	APHA (22nd Edi) 10500-C

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

RESULTS OF MARINE WATER [M4 JUNA BANDAR N 22°47'577" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.38	8.35	8.29	8.17	8.24	8.20	8.19	8.15	8.15	8.12	8.07	8.01	IS3025(P11)83Re.02
2	Temperature	oC	30.8	30.5	30.6	30.4	30.3	30	29.7	29.5	29.9	29.8	29.8	29.6	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	94	80	97	86	119	102	105	93	113	102	97	83	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	3.0	Not Detected	3.4	Not Detected	3.2	Not Detected	3.1	Not Detected	2.7	Not Detected	2.3	Not Detected	IS 3025 (P44)1993Re.03 Edition2.1
5	Dissolved Oxygen	mg/L	6.0	5.9	5.9	5.8	6.0	5.8	5.9	5.8	6.0	5.7	5.9	5.75	IS3025(P38)89Re.99
6	Salinity	ppt	36.8	37.2	37.3	37.6	35.4	35.7	35.68	35.92	35.29	35.68	35.16	35.42	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22nd Edi)5520D
8	Nitrate as NO_3	µmol/L	2.45	2.14	2.73	2.59	2.61	2.53	2.74	2.58	2.47	2.31	2.46	2.31	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	0.59	0.45	0.65	0.53	0.75	0.65	0.69	0.61	0.73	0.64	0.57	0.49	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	2.58	2.50	2.38	2.29	2.51	2.38	2.37	2.29	2.16	1.97	2.28	2.17	IS3025(P34)88Cla.2.3
11	Phosphates as PO_4	µmol/L	2.64	2.44	2.84	2.76	2.69	2.58	1.99	1.87	2.39	2.31	2.53	2.46	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	5.02	5.09	5.74	5.41	5.87	5.56	5.8	5.48	5.36	4.92	5.31	4.97	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	9.0	Not Detected	13.6	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	38415	37818	38742	39052	36992	37280	37256	37472	36874	37258	36472	36472	IS3025(P16)84Re.02
15	COD	mg/L	15	10	26.8	17.2	19.6	Not Detected	17.3	Not Detected	13.2	11.6	10.28	Not Detected	APHA(22nd Edi) 5520-D Open Reflux
A	**Phytoplankton**														
16.1	Chlorophyll	mg/m^3	2.61	2.32	2.52	2.28	2.56	2.37	2.48	2.25	2.21	2.13	2.04	1.95	APHA (22nd Edi) 10200-H
16.2	Phaeophytin	mg/m^3	0.77	0.65	0.86	0.69	0.8	0.6	0.90	0.72	1.17	0.84	0.93	0.30	APHA (22nd Edi) 10200-H
16.3	Cell Count	No. x 10^3/L	131	101	121	91	139	109	123	96	134	110	127	89	APHA (22nd Edi) 10200-H

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

16.4	Name of Group Number and name of group species of each group	--	Melosira sp. Closteriu m sp. Biddulphi a sp. Rhizosole nia sp.	Thallasios ira sp. Nitzschia sp. Navicula sp. Fragillaria sp.	Thallasios ira sp. Coscinodi scus sp. Rhizosole nia sp. Pleurosig ma sp.	Navicula sp. Nitzschia sp. Melosira sp.	Rhizosole nia sp. Nitzschia sp. Synedra sp. Pleurosig ma sp. Coscinodi scus sp.	Navicula sp. Cheatocer ous sp. Biddulphi a sp. Melosira sp.	Navicula sp. Pleurosig ma sp. Biddulphi a sp. Coscinodi scus sp.	Synedra sp. Chetocen s sp. Staurond s sp. Nitzschia sp.	Navicula sp. Pleurosig ma sp. Biddulphi a sp. Coscinodi scus sp.	Synedra sp. Chetocen s sp. Staurond s sp. Nitzschia sp.	Nitzschia sp. Melosira sp. Ceratium sp. Pleurosig ma sp. Coscinod iscus sp.	Cyclotella sp. Biddulphi a sp. Synedra sp. Nitzschia sp.--	APHA (22nd Edi) 10200-H
B	**Zooplanktons**													
17.1	Abundance (Population)	noX10^3/ 100 m^3	31		27		30		25		31		28	APHA (22nd Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Polychaetes Decapods Gastropods Medusae		Siphnophores Chaetognathes Polychaetes Isopods		Polychaetes Decapods Ostracods Copepods		Polychaetes Gastropods Bivalves Ostracods		Polychaetes Gastropods Decapods		Foraminiferans Gastropods Lamellibranches Amphipods	APHA (22nd Edi) 10200-G
17.3	Total Biomass	ml/100 m^3	2.9		2.5		2.65		2.5		3.0		2.75	APHA (22nd Edi) 10200-G
C	**Microbiological Parameters**													
18.1	Total Bacterial Count	CFU/ml	2450		2340		2540		2160		2180		2390	IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present	APHA(22nd Edi)9 221-D
18.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent	IS:1622:1981Edi .2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present	IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent	IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent	IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent	IS : 5887 (P-5)

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

RESULTS OF SEDIMENT ANALYSIS [M4 JUNA BANDAR N 22°47'577" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021	MAY 2021	JUNE 2021	JULY 2021	AUGUST 2021	SEPTEMBER 2021	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.54	0.48	0.46	0.4	0.42	0.39	FCO:2007
2	Phosphorus as P	µg/g	603	590	560	574	664	582	APHA(22nd Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
5	**Heavy Metals**								
5.1	Aluminum as Al	%	4.86	4.72	4.82	4.62	4.83	4.64	AAS APHA 3111 B
5.2	Total Chromium as Cr^{+3}	µg/g	152	129	139	114	129	112	AAS 3111B
5.3	Manganese as Mn	µg/g	693	658	587	630	675	576	AAS APHA 3111 B
5.4	Iron as Fe	%	4.78	4.42	4.69	4.27	4.78	4.52	AAS APHA(22nd Edi)3111 B
5.5	Nickel as Ni	µg/g	59	38.6	43.2	35.6	41.92	51.6	AAS APHA(22nd Edi)3111 B
5.6	Copper as Cu	µg/g	47	52.9	39.5	27.4	38.4	32.94	AAS APHA(22nd Edi)3111 B
5.7	Zinc as Zn	µg/g	127	108	117	92.8	113	98.7	AAS APHA(22nd Edi)3111 B
5.8	Lead as Pb	µg/g	3.38	2.93	2.59	2.17	2.64	2.17	AAS APHA(22nd Edi)3111 B
5.9	Mercury as Hg	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	AAS APHA- 3112 B
6	**Benthic Organisms**								
6.1	Macrobenthos	--	Gastropods Amphipods Bivalves	Polychaetes Gastropods Crustaceans	Polychaetes Amphipods Branchyarans	Polychaetes Gastropods Bivalves	Gastropods Amphipods Decapods	Gastropods Polychaetes Amphipods	APHA (22nd Edi) 10500-C
6.2	MeioBenthos	--	Nematodes	Foraminiferams	Foraminiferams	Foraminiferams	Foraminiferams	Nematodes	APHA (22nd Edi) 10500-C
6.3	Population	no/m^2	351	292	322	499	322	352	APHA (22nd Edi) 10500-C

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai
Lab Manager (Q)

RESULTS OF MARINE WATER [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.43	8.40	8.34	8.25	8.23	8.16	8.15	8.12	8.13	8.09	8.08	8.03	IS3025(P11)83Re.02
2	Temperature	oC	30.7	30.5	30.6	30.4	30.3	30.1	29.7	29.4	29.9	29.8	29.9	29.8	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	88	80	95	87	104	116	102	89	113	91	105	89	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	4.0	Not Detected	3.5	Not Detected	3.2	Not Detected	3.1	Not Detected	2.7	Not Detected	2.4	Not Detected	IS 3025 (P44)1993Re.03Edition2.1
5	Dissolved Oxygen	mg/L	6.2	6	5.9	5.8	6.0	5.9	5.9	5.8	5.9	5.7	6.0	5.85	IS3025(P38)89Re.99
6	Salinity	ppt	37.2	37.5	37.1	37.4	35.3	35.7	35.86	36.12	35.36	35.69	35.14	35.388	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22nd Edi)5520D
8	Nitrate as NO_3	µmol/L	2.71	2.78	2.83	2.51	2.47	2.38	2.36	2.19	2.47	2.39	2.37	2.26	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	0.59	0.66	0.75	0.60	0.59	0.51	0.64	0.53	0.68	0.57	0.74	0.53	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	1.95	2.10	2.31	2.24	2.28	2.17	2.17	2.10	2.31	2.24	2.59	2.47	IS3025(P34)88Cl a.2.3
11	Phosphates as PO_4	µmol/L	2.69	2.51	2.19	1.93	2.49	2.43	2.13	1.95	2.39	2.33	2.17	2.08	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	5.75	5.54	5.89	5.35	5.34	5.06	5.17	4.82	5.46	5.20	5.70	5.26	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	7.0	Not Detected	15.4	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	38612	38796	38556	38842	36897	37286	37148	37684	36948	37264	36234	36462	IS3025(P16)84Re.02
15	COD	mg/L	20	17.2	25.2	18.4	21.4	Not Detected	17.2	Not Detected	12.76	Not Detected	10.76	Not Detected	APHA(22nd Edi) 5520-D Open Reflux
A	**Phytoplankton**														
16.1	Chlorophyll	mg/m^3	2.75	2.61	2.65	2.57	2.56	2.4	2.37	2.30	2.24	2.20	2.21	2.13	APHA (22nd Edi) 10200-H
16.2	Phaeophytin	mg/m^3	2.26	1.08	2.35	1.12	2.5	1.3	1.60	1.39	1.73	1.50	1.48	1.84	APHA (22nd Edi) 10200-H
16.3	Cell Count	No. x 10^3/L	162	116	152	102	190	118	164	98	168	108	156	98	APHA (22nd Edi) 10200-H

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

16.4	Name of Group Number and name of group species of each group	--	Skeletonema sp. Navicula sp. Biddulphia sp. Coscinodiscus sp.	Nitzschia sp. Fragillaria sp. Synedra sp. Melosira sp.	Amphipods sp. Biddulphia sp. Coscinodiscus sp. Rhizosolenia sp.	Navicula sp. Nitzschia sp. Synedra sp. Melosira sp.	Rhizosolenia sp. Cheatoceros sp. Pleurosigma sp. Skeletonema sp. Melosira sp.	Synedra sp. Coscinodiscus sp. Navicula sp. Nitzschia sp.	Coscinodiscus sp. Cheatoceros sp. Skeletonema sp. Thallasionema sp.	Nitzschia sp. Synedra sp. Cyclotella sp. Pleurosigma sp.	Coscinodiscus sp. Cheatoceros sp. Skeletonema sp. Rhizosolenia sp.	Nitzschia sp. Biddulphia sp. Pleurosigma sp. Navicula sp.	Gyinardia sp. Skeletonema sp. Cyclotella sp. Melosira sp. Nitzschia sp.	Thallasionema sp. Amphipora sp. Cymbella sp. Pleurosigma sp.--	APHA (22nd Edi) 10200-H
B	**Zooplanktons**													
17.1	Abundance (Population)	noX10^3/ 100 m^3	28		24		28	23		29		26		APHA (22nd Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Polychaetes Amphipods Decapods Medusae		Polychaetes Gastropods Decapods		Gastropods Decapods Mysids Chaetognathes	Polychaetes Bivalves Decapods Foraminiferans		PolychaetesChaetognaths Decapods		GastropodsOstracodsAmphipods Lamellibranches		APHA (22nd Edi) 10200-G
17.3	Total Biomass	ml/100 m^3	2.4		2.1		2.4	2.2		2.8		2.55		APHA (22nd Edi) 10200-G
C	**Microbiological Parameters**													
18.1	Total Bacterial Count	CFU/ml	2340		2310		2280	2530		2510		2780		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present	Present		Present		Present		APHA(22ndEdi)9221-D
18.3	Ecoli	/ml	Absent		Absent		Absent	Absent		Absent		Absent		IS:1622:1981Edi. 2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present	Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent	Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent	Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent	Absent		Absent		Absent		IS : 5887 (P-5)

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

RESULTS OF SEDIMENT ANALYSIS [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021	MAY 2021	JUNE 2021	JULY 2021	AUGUST 2021	SEPTEMBER 2021	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.58	0.47	0.45	0.41	0.38	0.36	FCO:2007
2	Phosphorus as P	µg/g	593	618	574	517	629	528	APHA(22nd Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
5	**Heavy Metals**								
5.1	Aluminum as Al	%	4.87	4.53	4.69	4.46	4.67	4.53	AAS APHA 3111 B
5.2	Total Chromium as Cr^{+3}	µg/g	143	117	127	107	119	129	AAS 3111B
5.3	Manganese as Mn	µg/g	724	692	568	612	635	558	AAS APHA 3111 B
5.4	Iron as Fe	%	4.76	4.52	4.72	4.58	4.73	4.80	AAS APHA(22nd Edi)3111 B
5.5	Nickel as Ni	µg/g	61	53.7	35.64	31.76	37.94	42.99	AAS APHA(22nd Edi)3111 B
5.6	Copper as Cu	µg/g	35	41.9	47.3	39.84	31.26	35.6	AAS APHA(22nd Edi)3111 B
5.7	Zinc as Zn	µg/g	123	109	128	112	135	128	AAS APHA(22nd Edi)3111 B
5.8	Lead as Pb	µg/g	3.17	2.67	2.59	2.19	2.28	2.16	AAS APHA(22nd Edi)3111 B
5.9	Mercury as Hg	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	AAS APHA- 3112 B
6	**Benthic Organisms**								
6.1	Macrobenthos	--	Polychaetes Crustaceans Bivalves	Polychaetes Gastropods Crustaceans	Polychaetes Bivalves Crustaceans	Polychaetes Gastropods Bivalves	Polychaetes Crustaceans Decapods	Gastropods Polychaetes Amphipods	APHA (22nd Edi) 10500-C
6.2	MeioBenthos	--	--	Namatodes	Namatodes	Foraminiferams	Foraminiferams	Nematodes	APHA (22nd Edi) 10500-C
6.3	Population	no/m 2	409	322	353	439	350	322	APHA (22nd Edi) 10500-C

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

RESULTS OF MARINE WATER [M7 EAST PORT N 22°47'120" E 069°47'110"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.46	8.40	8.34	8.29	8.27	8.22	8.17	8.14	8.11	8.07	8.02	7.95	IS3025(P11)83Re.02
2	Temperature	oC	30.7	30.5	30.6	30.3	30.3	30.1	29.9	29.8	30	29.8	29.8	29.7	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	129	102	112	98	105	118	114	97	121	105	113	93	IS3025(P17)84Re.02
4	BOD (3 Days @ 27°C)	mg/L	4.0	Not Detected	3.9	Not Detected	3.2	Not Detected	3.2	Not Detected	2.9	Not Detected	2.3	Not Detected	IS 3025 (P44)1993Re.03Edition2.1
5	Dissolved Oxygen	mg/L	6.4	6	6.0	5.9	6.0	5.8	5.9	5.7	5.8	5.7	6.0	5.9	IS3025(P38)89Re.99
6	Salinity	ppt	36.9	37.3	37.4	37.6	35.4	35.7	36.12	36.34	35.69	35.98	35.14	35.46	APHA (22ndEdi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22ndEdi)5520D
8	Nitrate as NO_3	µmol/L	2.44	2.65	2.69	2.51	2.75	2.51	2.57	2.39	2.41	2.35	2.57	2.40	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	0.25	0.36	0.57	0.43	0.46	0.42	0.49	0.41	0.73	0.68	0.53	0.34	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	2.71	2.84	2.86	2.59	2.61	2.53	2.38	2.18	2.27	2.21	2.36	2.28	IS3025(P34)88Cla.2.3
11	Phosphates as PO_4	µmol/L	2.65	2.78	2.49	2.24	2.37	2.21	2.51	2.39	2.43	2.38	2.31	2.19	APHA(22ndEdi) 4500 C
12	Total Nitrogen	µmol/L	5.4	5.85	6.12	5.53	5.82	5.46	5.44	4.98	5.41	5.22	5.46	5.02	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	9.0	Not Detected	16.4	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	37948	38984	38842	39026	37108	37290	37669	37864	37264	37530	36242	36514	IS3025(P16)84Re.02
15	COD	mg/L	29	18	28.7	17.3	21.6	Not Detected	17.8	Not Detected	13.9	10.76	9.94	Not Detected	APHA(22ndEdi) 5520-D Open Reflux
A	**Phytoplankton**														
16.1	Chlorophyll	mg/m^3	2.69	2.48	2.77	2.40	2.67	2.53	2.48	2.37	2.36	2.21	2.2	1.94	APHA (22ndEdi) 10200-H
16.2	Phaeophytin	mg/m^3	0.30	0.43	0.22	0.51	0.3	0.4	0.52	0.54	0.64	0.70	0.80	0.97	APHA (22ndEdi) 10200-H
16.3	Cell Count	No. x 10^3/L	136	104	130	92	152	98	136	90	130	104	124	86	APHA (22nd Edi) 10200-H

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

16.4	Name of Group Number and name of group species of each group	--	Biddulphia sp. Cymbella sp. Thallasionema sp. Melosira sp. Peridinium sp.	Coscinodiscus sp. Navicula sp. Nitzschia sp. Fragillaria sp.	Thallasiosira sp. Rhizosolenia sp. Pleurosigma sp. Coscinodiscus sp. Melosira sp.	Cyclotella sp.Navicula sp.Nitzschia sp.Guinordia sp.	Thallasiosira sp.Rhizosolenia sp.Pleurosigma sp.Coscinodiscus sp.Melosira sp.	Melosira sp.Navicula sp.Nitzschia sp.Synedra sp.	Rhizosolenia sp. Chaetognathes sp.Pleurosigma sp.Skeletonema sp.	Nitzschia sp.Navicula sp.Coscinodiscus sp.Synedra sp.	Amphora sp.Peridinium sp.Skeletonema sp.Thallasiosira sp.Surirella sp.	Navicula sp.Rhizosolenia sp.Synedra sp.Biddulphia sp.	Pinnularia sp.Staurons sp.Cymbella sp.Fragillaria sp.Coscinodiscus sp.	Cyclotella sp.Cheatocerous sp.Gyrosigma sp.Melosira sp.--	APHA (22nd Edi) 10200-H
B	**Zooplanktons**													
17.1	Abundance (Population)	noX10^3/ 100 m^3	29		26		30		24		32		28	APHA (22nd Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	GastropodsPolychaetes ForaminiferansOstracods		OstracodsPolychaetes Molluscans		CopepodsPolychaetesForaminiferans Decapods		CopepodsPolychaetes Gastropods		HydrozoaPolychaetes CrustaceansBivalves		Foraminiferans GastropodsAmphipods Bivalves	APHA (22nd Edi) 10200-G
17.3	Total Biomass	ml/100 m^3	2.4		2.1		2.45		2.3		3.0		2.60	APHA (22nd Edi) 10200-G
C	**Microbiological Parameters**													
18.1	Total Bacterial Count	CFU/ml	2440		2370		2270		2490		2340		2610	IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present	APHA(22ndEdi)9221-D
18.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent	IS:1622:1981Edi.2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present	IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent	IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent	IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent	IS : 5887 (P-5)

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

RESULTS OF MARINE WATER [M8 RIGHT SIDE OF BOCHA CREEK N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.45	8.48	8.31	8.26	8.25	8.20	8.16	8.13	8.14	8.10	8.05	7.99	IS3025(P11)83Re .02
2	Temperature	oC	30.6	30.9	30.7	30.5	30.3	30	30	29.9	30	29.8	29.9	29.7	IS3025(P9)84Re. 02
3	Total Suspended Solids	mg/L	101	117	105	96	117	108	104	98	117	103	104	91	IS3025(P17)84Re .02
4	BOD (3 Days @ 27 °C)	mg/L	3.0	Not Detected	3.4	Not Detected	3.2	Not Detected	3.0	Not Detected	2.9	Not Detected	2.3	Not Detected	IS 3025 (P44)1993Re.03E dition2.1
5	Dissolved Oxygen	mg/L	6.1	5.8	6.0	5.8	6.0	5.9	5.9	5.7	5.9	5.8	6.0	5.9	IS3025(P38)89Re .99
6	Salinity	ppt	36.9	37.4	37.2	37.6	35.3	35.6	36.24	36.48	35.73	35.96	35.20	35.72	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22nd Edi)552 0D
8	Nitrate as NO_3	µmol/L	2.56	2.71	2.89	2.71	2.65	2.47	2.48	2.36	2.56	2.48	2.43	2.37	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	0.2	0.27	0.67	0.53	0.48	0.39	0.7	0.61	0.87	0.79	0.69	0.52	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	2.61	2.75	2.51	2.34	2.76	2.62	2.35	2.19	2.27	2.20	2.17	2.04	IS3025(P34)88Cla .2.3
11	Phosphates as PO_4	µmol/L	2.56	2.40	2.47	2.29	2.35	2.17	1.75	1.63	2.16	1.97	2.28	2.13	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	5.37	5.73	6.07	5.58	5.89	5.48	5.53	5.16	5.70	5.47	5.29	4.93	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	7.0	Not Detected	12.3	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	37844	38814	38652	39034	36914	37214	37782	37982	37306	37512	36284	36764	IS3025(P16)84Re .02
15	COD	mg/L	25	16	20.8	17.2	20.2	Not Detected	16.2	Not Detected	12.9	10.2	9.82	Not Detected	APHA(22nd Edi) 5520-D Open Reflux
A	**Phytoplankton**														
16.1	Chlorophyll	mg/m^3	2.61	2.48	2.67	2.42	2.71	2.5	2.45	2.25	2.28	2.13	2.14	1.93	APHA (22nd Edi) 10200-H
16.2	Phaeophytin	mg/m^3	0.36	0.44	0.30	0.50	0.3	0.4	0.52	0.67	0.69	0.79	0.82	0.99	APHA (22nd Edi) 10200-H
16.3	Cell Count	No. x 10^3/L	148	98	136	90	152	118	134	92	150	104	142	92	APHA (22nd Edi) 10200-H

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

16.4	Name of Group Number and name of group species of each group	--	Rhizosolenia sp. Biddulphia sp. Thallasionema sp. Coscinodiscus sp.	Navicula sp. Fragillaria sp. Nitzschia sp. Melosira sp.	Biddulphia sp. Rhizosolenia sp. Amphipods sp. Thallasiosira sp. Coscinodiscus sp.	Nitzschia sp. Pleurosigma sp. Melosira sp. Synedra sp.	Thallasionema sp. Peridinium sp. Thallasiosira sp. Melosira sp. Coscinodiscus sp.	Navicula sp. Nitzschia sp. Rhizosolenia sp. Synedra sp.	Rhizosolenia sp. Chaetognathes sp. Thallasiosira sp. Biddulphia sp.	Nitzschia sp. Navicula sp. Coscinodiscus sp. Synedra sp.	Skeletonema sp. Synedra sp. Pleurosigma sp. Amphora sp.	Thallasiosira sp. Navicula sp. Synedra sp. Surirella sp.	Skeletonema sp. Pleurosigma sp. Cyclotella sp. Melosira sp. Guinardia sp.	Nitzschia sp. Amphipora sp. Biddulphia sp. Gyrosigma sp.--	APHA (22nd Edi) 10200-H
B	**Zooplanktons**														
17.1	Abundance (Population)	noX10^3/ 100 m^3	26		21		27		22		28		25		APHA (22nd Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Amphipods Gastropods Polychaetes Ostracods		Gastropods Decapods Namatodes Fish eggs		Foraminiferans Polychaetes Copepods Ostracods		Decapods Copepods Gastropods		Polychaetes Ostracods Decapods Bivalves		Polychaetes Decapods Lamellibranches Isopods		APHA (22nd Edi) 10200-G
17.3	Total Biomass	ml/100 m^3	2.4		2.1		2.4		2.1		2.7		2.45		APHA (22nd Edi) 10200-G
C	**Microbiological Parameters**														
18.1	Total Bacterial Count	CFU/ml	2410		2320		2490		2570		2840		2480		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present		APHA(22ndEdi)9221-D
18.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi. 2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

RESULTS OF SEDIMENT ANALYSIS [M8 RIGHT SIDE OF BOCHA CREEK – N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021	MAY 2021	JUNE 2021	JULY 2021	AUGUST 2021	SEPTEMBER 2021	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.57	0.46	0.47	0.54	0.43	0.38	FCO:2007
2	Phosphorus as P	µg/g	518	612	568	603	638	570	APHA(22nd Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
5	**Heavy Metals**								
5.1	Aluminum as Al	%	4.81	4.63	4.76	4.58	4.7	4.56	AAS APHA 3111 B
5.2	Total Chromium as Cr^{+3}	µg/g	135	112	129	117	128	138	AAS 3111B
5.3	Manganese as Mn	µg/g	746	674	583	619	650	564	AAS APHA 3111 B
5.4	Iron as Fe	%	4.73	4.58	4.69	4.52	4.64	4.72	AAS APHA(22nd Edi)3111 B
5.5	Nickel as Ni	µg/g	65	48.35	37.6	31.76	37.93	41.98	AAS APHA(22nd Edi)3111 B
5.6	Copper as Cu	µg/g	53	39.68	43.2	35.2	42.8	32.6	AAS APHA(22nd Edi)3111 B
5.7	Zinc as Zn	µg/g	112	105	128	98.52	110	115	AAS APHA(22nd Edi)3111 B
5.8	Lead as Pb	µg/g	3.18	2.87	2.59	2.18	3.14	2.30	AAS APHA(22nd Edi)3111 B
5.9	Mercury as Hg	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	AAS APHA- 3112 B
6	**Benthic Organisms**								
6.1	Macrobenthos	--	Polychaetes Crustaceans Amphipods	Polychaetes Gastropods Crustaceans	Polychaetes Amphipods Crustaceans	Polychaetes Crustaceans Decapods	Polychaetes Gastropods Amphipods	Gastropods Polychaetes Amphipods	APHA (22nd Edi) 10500-C
6.2	MeioBenthos	--	Nematodes	Foraminiferams	Foraminiferams	Foraminiferams Nematodes	Foraminiferams	Nematodes	APHA (22nd Edi) 10500-C
6.3	Population	no/m^2	379	382	262	408	294	350	APHA (22nd Edi) 10500-C

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

RESULTS OF MARINE WATER [M11 MPT T1 JETTY N 22°42'278" E 069°43'450"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.39	8.35	8.31	8.27	8.24	8.19	8.21	8.17	8.17	8.13	8.09	8.02	IS3025(P11)83Re .02
2	Temperature	oC	30.7	30.5	30.6	30.4	30	29.8	29.9	29.7	30	29.8	29.8	29.7	IS3025(P9)84Re. 02
3	Total Suspended Solids	mg/L	107	96	112	98	109	113	112	95	109	87	97	81	IS3025(P17)84Re .02
4	BOD (3 Days @ 27 °C)	mg/L	2.8	Not Detected	3.2	Not Detected	3.0	Not Detected	3.1	Not Detected	2.5	Not Detected	2.4	Not Detected	IS 3025 (P44)1993Re.03E dition2.1
5	Dissolved Oxygen	mg/L	6.2	6	6.0	5.8	6.1	5.9	5.9	5.7	6.0	5.8	6.0	5.8	IS3025(P38)89Re .99
6	Salinity	ppt	37	37.3	37.3	37.7	35.2	35.5	36.42	36.68	35.82	36.24	35.28	35.72	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22nd Edi)5520D
8	Nitrate as NO_3	µmol/L	2.4	2.71	2.58	2.41	2.64	2.53	2.47	2.35	2.39	2.25	2.48	2.40	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	0.45	0.49	0.69	0.53	0.78	0.69	0.69	0.57	0.58	0.41	0.53	0.42	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	2.80	2.54	2.76	2.49	2.45	2.36	2.38	2.19	2.27	2.19	2.35	2.29	IS3025(P34)88Cla .2.3
11	Phosphates as PO_4	µmol/L	2.45	2.16	2.38	2.16	2.57	2.48	1.91	1.77	2.28	2.10	2.24	2.18	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	5.65	5.84	6.03	5.43	5.87	5.58	5.54	5.11	5.24	4.85	5.36	5.11	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	7.8	Not Detected	10.3	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	37945	38812	38742	39117	36814	37129	38014	38192	36834	37798	36346	36754	IS3025(P16)84Re .02
15	COD	mg/L	25	17	21.8	18.4	20.1	Not Detected	16.4	Not Detected	10.98	Not Detected	9.24	Not Detected	APHA(22nd Edi) 5520-D Open Reflux
A	**Phytoplankton**														
16.1	Chlorophyll	mg/m^3	2.99	2.77	2.93	2.67	2.83	2.61	2.56	2.50	2.5	2.34	2.21	1.92	APHA (22nd Edi) 10200-H
16.2	Phaeophytin	mg/m^3	2.84	2.19	2.89	2.30	2.1	2.1	2.41	2.16	2.16	2.25	0.89	0.59	APHA (22nd Edi) 10200-H
16.3	Cell Count	No. x 10^3/L	158	102	142	94	172	104	138	96	146	106	134	90	APHA (22nd Edi) 10200-H

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

16.4	Name of Group Number and name of group species of each group	--	Biddulphia sp. Coscinodiscus sp. Rhizosolenia sp. Thallasiosira sp.	Nitzschia sp. Thallasiosira sp. Pleurosigma sp.	Coscinodiscus sp. Rhizosolenia sp. Pleurosigma sp. Gyrosima sp. Peridinium sp.	Cyclotella sp. Nitzschia sp. Melosira sp. Synedra sp.	Thallasionema sp. Peridinium sp. Biddulphia sp. Rhizosolenia sp.	Melosira sp. Synedra sp. Nitzschia sp. Skeletonema sp.	Thallasiosira sp. Pleurosigma sp. Biddulphia sp. Skeletonema sp.	Navicula sp. Synedra sp. Coscinodiscus sp. Rhizosolenia sp.	Thallasiosira sp. Amphora sp. Peridinium sp. Gyrosigma sp.	Nitzschia sp. Skeletonema sp. Navicula sp. Synedra sp.	Surirella sp. Amphipro ra sp. Cyclotella sp. Ceratium sp. Guinardia sp.	Biddulphia sp. Cymbella sp. Skeletonema sp. Gyrosigma sp.--	APHA (22nd Edi) 10200-H
B	**Zooplanktons**														
17.1	Abundance (Population)	noX10^3/ 100 m^3	26		22		27		22		28		24		APHA (22nd Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Amphipods Gastropods Ostracods Foraminiferans		Decapods Isopods Polychaetes Namatodes		Decapods Isopods Polychaetes Namatodes		Decapods Gastropods Polychaetes Ostracods		Hydrozoa Gastropods Polychaetes Ostracods		Foraminiferans Polychaetes Gastropods		APHA (22nd Edi) 10200-G
17.3	Total Biomass	ml/100 m^3	2.4		2.0		2.45		2.2		2.7		2.35		APHA (22nd Edi) 10200-G
C	**Microbiological Parameters**														
18.1	Total Bacterial Count	CFU/ml	2290		2430		2510		2400		2480		2540		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present		APHA(22ndEdi)92219.21-D
18.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi. 2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

RESULTS OF MARINE WATER [M12 SPM N 22°40'938" E 069°39'191"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.47	8.43	8.34	8.29	8.21	8.18	8.17	8.13	8.13	8.09	8.07	8.02	IS3025(P11)83Re.02
2	Temperature	oC	30.6	30.3	30.7	30.4	30.2	30	30	29.9	29.9	29.8	29.7	29.5	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	119	133	129	102	114	109	119	105	125	110	114	103	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	4.0	Not Detected	3.5	Not Detected	3.1	Not Detected	3.2	Not Detected	2.9	Not Detected	2.4	Not Detected	IS 3025 (P44)1993Re.03Edition2.1
5	Dissolved Oxygen	mg/L	6.1	5.8	6.0	5.8	6.1	5.9	5.9	5.7	5.9	5.8	6.0	5.7	IS3025(P38)89Re.99
6	Salinity	ppt	37.2	37.5	37.3	37.5	35.5	35.7	36.32	36.58	35.94	36.32	35.32	35.84	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22nd Edi)5520D
8	Nitrate as NO_3	µmol/L	2.14	2.43	2.47	2.39	2.53	2.39	2.48	2.35	2.68	2.59	2.54	2.48	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	0.35	0.41	0.58	0.47	0.76	0.60	0.81	0.73	0.75	0.63	0.65	0.52	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	2.41	2.68	2.93	2.76	2.65	2.47	2.54	2.39	2.39	2.28	2.27	2.20	IS3025(P34)88Cla.2.3
11	Phosphates as PO_4	µmol/L	2.31	2.16	2.57	2.41	2.31	2.28	1.89	1.75	2.24	2.13	2.38	2.31	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	5.05	5.42	5.98	5.62	5.94	5.46	5.83	5.47	5.82	5.50	5.46	5.20	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	10.1	Not Detected	13.4	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	38689	38974	38759	38927	37093	37276	37294	38094	37498	37846	36384	36928	IS3025(P16)84Re.02
15	COD	mg/L	29	18	24.3	17.5	19.9	Not Detected	16.8	Not Detected	12.8	10.6	9.58	Not Detected	APHA(22nd Edi) 5520-D Open Reflux
A	**Phytoplankton**														
16.1	Chlorophyll	mg/m^3	2.65	2.40	2.61	2.40	2.67	2.45	2.5	2.40	2.56	2.45	2.24	2.16	APHA (22nd Edi) 10200-H
16.2	Phaeophytin	mg/m^3	2.52	2.19	2.58	2.19	2.5	2.1	2.31	2.19	2.26	2.14	0.78	0.33	APHA (22nd Edi) 10200-H
16.3	Cell Count	No. x $10^3/L$	144	118	138	103	152	118	126	101	158	103	146	101	APHA (22nd Edi) 10200-H

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

16.4	Name of Group Number and name of group species of each group	--	Biddulphia sp. Rhizosolenia sp. Skeletonema sp. Coscinodiscus sp.	Nitzschia sp. Navicula sp. Pleurosigma sp. Melosira sp.	Guinordia sp. Melosira sp. Peridinium sp. Thallasiosira sp.	Nitzschia sp. Navicula sp. Biddulphia sp. Cyclotella sp.	Rhizosolenia sp. Thallasionema sp. Biddulphia sp. Skeletonema sp. Coscinodiscus sp.	Navicula sp. Nitzschia sp. Melosira sp. Synedra sp.	Biddulphia sp. Coscinodiscus sp. Chaetognathes sp. Rhizosolenia sp.	Nitzschia sp. Navicula sp. Pleurosigma sp. Synedra sp.	Pleurosigma sp. Peridinium sp. Thallasiosira sp. Biddulphia sp. Melosira sp.	Synedra sp. Nitzschia sp. Surirella sp. Navicula sp.	Thallasionema sp. Loscinodiscus sp. Cyclotella sp. Amphipora sp. Rhizosolenia sp.	Nitzschia sp. Synedra sp. Skeletonema sp. Biddulphia sp. Gyro sigma sp.	APHA (22nd Edi) 10200-H
B	**Zooplanktons**														
17.1	Abundance (Population)	noX10^3/ 100 m^3	30		25		27		23		26		23		APHA (22nd Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Polychaetes Decapods Amphipods Mysids		Isopods Decapods Polychaetes Mysids		Copepods Decapods Gastropods Ostracods		Polychaetes Decapods Chaetocenes Ostracods		Polychaetes Gastropods Chaetognaths Bivalves		Polychaetes Gastropods Decapods Lamellibranches		APHA (22nd Edi) 10200-G
17.3	Total Biomass	ml/100 m^3	2.6		2.2		2.25		2.1		2.5		2.25		APHA (22nd Edi) 10200-G
C	**Microbiological Parameters**														
18.1	Total Bacterial Count	CFU/ml	2350		2470		2350		2220		2480		2620		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present		APHA(22ndEdi)92219.21-D
18.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi. 2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

RESULTS OF ETP OUTLET

SR. NO.	TEST PARAMETERS	UNIT	Liquid Terminal ETP Outlet						GPCB Permissible Limit
			APR-21	MAY-21	JUN-21	JUL-21	AUG-21	SEP-21	
1	Colour	Co-pt	20	30	30	25	30	25	100
2	pH	--	7.59	7.68	7.99	7.84	7.94	6.58	6.5 to 8.5
3	Temperature	°C	30.2	30.1	30.3	29.9	30.1	30	40
4	Total Suspended Solids	mg/L	29	32	52	24	37	27	100
5	Total Dissolved Solids	mg/L	793	819	2069	1839	1968	1568	2100
6	COD	mg/L	65	72	84	70	86	78	100
7	BOD (3 Days @ 27 °C)	mg/L	12	16	19	15	17	15	30
8	Chloride as Cl	mg/L	243	352	415	408	374	358	600
9	Oil & Grease	mg/L	2.8	3.4	3.6	2.9	3.8	4.2	10
10	Sulphate as SO_4	mg/L	206	238	401	320	276	216	1000
11	Ammonical Nitrogen as NH_3	mg/L	1.76	2.34	5.3	8.56	7.39	8.13	50
12	Phenolic Compound	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	1
13	Copper as Cu	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	3
14	Lead as Pb	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.1
15	Sulphide as S	mg/L	0.28	0.14	0.5	0.12	0.16	0.18	2
16	Cadmium as Cd	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	2
17	Fluoride as F	mg/L	0.13	0.12	0.3	0.21	0.32	0.27	2
18	Residual Chlorine	mg/L	0.6	0.8	0.6	0.7	0.8	0.7	0.5 min

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai
Lab Manager (Q)

RESULT OF AMBIENT AIR QUALITY MONITORING

ADANI PORT – TUG BERTH 600 KL PUMP HOUSE								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m³	Particulate Matter (PM 2.5) µg/m³	Sulphur Dioxide (SO2) µg/m³	Oxides of Nitrogen (NO2) µg/m³	Carbon Monoxide as CO mg/m³	Hydrocarbon as CH_4 mg/m³	Benzene as C_6H_6 µg/m³
1	02/04/2021	62.72	28.62	20.52	34.26	0.30	ND*	ND*
2	06/04/2021	72.44	36.36	16.33	29.48	0.74	ND*	ND*
3	09/04/2021	68.49	27.71	19.59	37.57	0.65	ND*	ND*
4	13/04/2021	76.33	32.37	23.41	40.28	0.55	ND*	ND*
5	16/04/2021	63.47	29.41	17.71	35.43	0.82	ND*	ND*
6	20/04/2021	80.38	46.39	14.43	33.48	0.52	ND*	ND*
7	22/04/2021	74.26	42.52	18.50	30.56	0.76	ND*	ND*
8	26/04/2021	66.53	31.41	15.48	36.22	0.63	ND*	ND*
9	29/04/2021	78.58	35.32	10.57	24.23	0.37	ND*	ND*
10	03/05/2021	57.54	31.54	9.50	24.33	0.29	ND*	ND*
11	07/05/2021	77.56	46.51	15.31	28.61	0.57	ND*	ND*
12	10/05/2021	63.45	34.53	18.46	32.58	0.48	ND*	ND*
13	13/05/2021	70.56	38.40	16.25	29.35	0.47	ND*	ND*
14	19/05/2021	62.51	27.50	12.70	18.66	0.30	ND*	ND*
15	21/05/2021	71.52	37.65	19.40	35.44	0.49	ND*	ND*
16	24/05/2021	80.23	41.56	13.50	31.53	0.66	ND*	ND*
17	27/05/2021	61.56	45.35	17.51	34.52	0.53	ND*	ND*
18	31/05/2021	72.43	40.56	8.78	26.76	0.71	ND*	ND*
19	03/06/2021	80.47	35.70	17.34	33.47	0.37	ND*	ND*
20	07/06/2021	72.66	26.34	18.67	39.53	0.21	ND*	ND*
21	10/06/2021	68.22	31.24	9.85	20.29	0.52	ND*	ND*
22	14/06/2021	77.52	40.27	19.57	30.27	0.66	ND*	ND*
23	17/06/2021	65.45	45.35	16.32	34.56	0.85	ND*	ND*
24	21/06/2021	59.65	32.37	10.26	29.52	0.53	ND*	ND*
25	24/06/2021	75.68	46.26	15.62	37.54	0.89	ND*	ND*
26	28/06/2021	82.62	43.60	12.54	26.61	0.41	ND*	ND*
27	02/07/2021	90.30	50.30	10.66	19.65	0.24	ND*	ND*
28	05/07/2021	95.36	46.85	11.40	23.53	0.38	ND*	ND*
29	08/07/2021	85.36	53.46	16.26	18.67	0.63	ND*	ND*
30	12/07/2021	75.62	36.45	13.41	21.36	0.29	ND*	ND*

Continue …

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

RESULT OF AMBIENT AIR QUALITY MONITORING

ADANI PORT – TUG BERTH 600 KL PUMP HOUSE								
Sr.No.	**Date of Sampling**	**Particulate Matter (PM10) µg/m³**	**Particulate Matter (PM 2.5) µg/m³**	**Sulphur Dioxide (SO2) µg/m³**	**Oxides of Nitrogen (NO2) µg/m³**	**Carbon Monoxide as CO mg/m³**	**Hydrocarbon as CH_4 mg/m³**	**Benzene as C_6H_6 µg/m³**
31	15/07/2021	86.36	47.51	21.36	33.24	0.18	ND*	ND*
32	19/07/2021	77.52	40.23	18.34	22.83	0.33	ND*	ND*
33	22/07/2021	70.37	38.32	12.44	25.58	0.40	ND*	ND*
34	26/07/2021	65.25	28.33	17.36	28.67	0.50	ND*	ND*
35	29/07/2021	79.62	44.35	19.27	32.51	0.76	ND*	ND*
36	16/08/2021	75.34	39.65	8.65	20.31	0.26	ND*	ND*
37	19/08/2021	80.42	35.45	12.39	23.34	0.16	ND*	ND*
38	23/08/2021	72.12	33.53	23.45	38.45	0.55	ND*	ND*
39	26/08/2021	66.60	36.24	20.23	33.45	0.41	ND*	ND*
40	30/08/2021	74.42	40.31	17.42	28.38	0.46	ND*	ND*
41	02/09/2021	70.63	40.23	19.60	33.40	0.41	ND*	ND*
42	06/09/2021	74.35	43.39	12.55	24.31	0.25	ND*	ND*
43	09/09/2021	81.36	45.35	16.23	32.68	0.37	ND*	ND*
44	13/09/2021	86.30	36.40	14.54	25.66	0.23	ND*	ND*
45	16/09/2021	60.33	24.34	9.62	18.70	0.46	ND*	ND*
46	20/09/2021	85.66	47.55	11.21	26.36	0.34	ND*	ND*
47	23/09/2021	67.62	26.38	8.36	16.36	0.39	ND*	ND*
LIMIT#		**100**	**60**	**80**	**80**	**4**	**Not Specified**	**5**
TEST METHOD		**IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)**	**Gravimetric-CPCB - Method (Vol.I,May-2011)**	**IS:5182(Part II):Improved West and Gaeke**	**IS:5182(Part VI):Modified Jacob &Hochheiser (NaOH-NaAsO2)**	**NDIR Digital Gas Analyzer**	**SOP: HC: GC/GCMS/Gas analyzer**	**IS 5182 (Part XI):2006/CPCB Method**

*Not Detected
#: Industrial, Residential, Rural and other Area Notification Dated 16th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai
Lab Manager (Q)

RESULT OF AMBIENT AIR QUALITY MONITORING

NEAR FIRE STATION								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m³	Particulate Matter (PM 2.5) µg/m³	Sulphur Dioxide (SO2) µg/m³	Oxides of Nitrogen (NO2) µg/m³	Carbon Monoxide as CO mg/m³	Hydrocarbon as CH_4 mg/m³	Benzene as C_6H_6 µg/m³
1	02/04/2021	73.54	32.45	14.58	27.54	0.24	ND*	ND*
2	06/04/2021	84.62	50.39	12.48	22.25	0.62	ND*	ND*
3	09/04/2021	56.37	33.42	8.35	16.69	0.54	ND*	ND*
4	13/04/2021	66.45	37.56	13.68	28.52	0.61	ND*	ND*
5	16/04/2021	54.24	23.63	11.23	20.30	0.49	ND*	ND*
6	20/04/2021	45.96	20.45	6.53	17.60	0.60	ND*	ND*
7	22/04/2021	52.63	38.39	9.42	14.26	0.22	ND*	ND*
8	26/04/2021	61.24	26.43	7.54	25.52	0.36	ND*	ND*
9	29/04/2021	53.23	22.46	15.28	19.27	0.31	ND*	ND*
10	03/05/2021	63.53	28.56	13.57	20.40	0.60	ND*	ND*
11	07/05/2021	72.55	40.27	7.63	15.29	0.41	ND*	ND*
12	10/05/2021	58.46	26.56	14.27	25.38	0.33	ND*	ND*
13	13/05/2021	65.42	23.63	17.59	32.39	0.78	ND*	ND*
14	19/05/2021	50.26	20.49	21.54	29.30	0.54	ND*	ND*
15	21/05/2021	60.23	25.64	15.71	30.57	0.42	ND*	ND*
16	24/05/2021	69.53	36.47	18.36	21.30	0.63	ND*	ND*
17	27/05/2021	57.58	24.34	10.27	16.58	0.70	ND*	ND*
18	31/05/2021	66.54	29.36	12.49	22.38	0.44	ND*	ND*
19	03/06/2021	65.65	26.56	15.32	25.65	0.48	ND*	ND*
20	07/06/2021	55.64	20.33	16.20	23.87	0.58	ND*	ND*
21	10/06/2021	71.33	36.51	11.54	28.53	0.54	ND*	ND*
22	14/06/2021	66.56	27.56	8.66	16.37	0.36	ND*	ND*
23	17/06/2021	60.36	32.66	10.23	20.34	0.70	ND*	ND*
24	21/06/2021	49.55	23.63	12.55	27.51	0.22	ND*	ND*
25	24/06/2021	61.25	33.50	14.22	24.64	0.73	ND*	ND*
26	28/06/2021	88.45	48.64	9.57	21.56	0.63	ND*	ND*
27	02/07/2021	71.81	43.20	8.59	16.37	0.57	ND*	ND*
28	05/07/2021	78.45	41.32	10.70	14.31	0.49	ND*	ND*
29	08/07/2021	73.66	46.34	15.42	15.31	0.30	ND*	ND*
30	12/07/2021	70.36	32.41	9.56	23.41	0.22	ND*	ND*

Continue …

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

RESULT OF AMBIENT AIR QUALITY MONITORING

NEAR FIRE STATION								
Sr.No.	**Date of Sampling**	**Particulate Matter (PM10) µg/m³**	**Particulate Matter (PM 2.5) µg/m³**	**Sulphur Dioxide (SO2) µg/m³**	**Oxides of Nitrogen (NO2) µg/m³**	**Carbon Monoxide as CO mg/m³**	**Hydrocarbon as CH_4 mg/m³**	**Benzene as C_6H_6 µg/m³**
31	15/07/2021	67.34	26.31	11.51	27.68	0.15	ND*	ND*
32	19/07/2021	58.38	29.32	13.66	30.32	0.47	ND*	ND*
33	22/07/2021	66.36	34.17	16.43	33.62	0.23	ND*	ND*
34	26/07/2021	60.27	37.51	14.23	31.21	0.32	ND*	ND*
35	29/07/2021	48.54	24.51	17.82	22.35	0.37	ND*	ND*
36	23/08/2021	92.38	45.33	11.58	32.32	0.48	ND*	ND*
37	26/08/2021	52.45	31.32	9.43	26.25	0.24	ND*	ND*
38	30/08/2021	65.67	36.43	12.81	20.52	0.58	ND*	ND*
39	02/09/2021	52.47	44.21	14.24	29.46	0.34	ND*	ND*
40	06/09/2021	62.36	27.64	7.70	18.48	0.29	ND*	ND*
41	09/09/2021	70.37	32.66	13.24	20.83	0.45	ND*	ND*
42	13/09/2021	80.36	31.45	9.46	28.40	0.14	ND*	ND*
LIMIT#		**100**	**60**	**80**	**80**	**4**	**Not Specified**	**5**
TEST METHOD		**IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)**	**Gravimetric-CPCB - Method (Vol.I,May-2011)**	**IS:5182(Part II):Improved West and Gaeke**	**IS:5182(Part VI):Modified Jacob &Hochheiser (NaOH-NaAsO2)**	**NDIR Digital Gas Analyzer**	**SOP: HC: GC/GCMS/Gas analyzer**	**IS 5182 (Part XI):2006/CPCB Method**

*Not Detected
#: Industrial, Residential, Rural and other Area Notification Dated 16th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

RESULT OF AMBIENT AIR QUALITY MONITORING

ADANI HOUSE								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m³	Particulate Matter (PM 2.5) µg/m³	Sulphur Dioxide (SO2) µg/m³	Oxides of Nitrogen (NO2) µg/m³	Carbon Monoxide as CO mg/m³	Hydrocarbon as CH_4 mg/m³	Benzene as C_6H_6 µg/m³
1	02/04/2021	56.28	29.60	11.58	23.63	0.34	ND*	ND*
2	06/04/2021	67.57	26.59	19.30	32.54	0.29	ND*	ND*
3	09/04/2021	62.16	31.52	16.53	29.22	0.32	ND*	ND*
4	13/04/2021	70.27	34.58	9.53	22.66	0.24	ND*	ND*
5	16/04/2021	51.55	16.56	15.32	31.56	0.38	ND*	ND*
6	20/04/2021	60.45	35.58	10.36	26.59	0.41	ND*	ND*
7	22/04/2021	58.66	28.68	14.28	21.27	0.58	ND*	ND*
8	26/04/2021	50.42	22.53	12.42	28.45	0.40	ND*	ND*
9	29/04/2021	63.22	25.38	17.60	30.40	0.48	ND*	ND*
10	03/05/2021	52.52	22.67	15.59	27.62	0.23	ND*	ND*
11	07/05/2021	82.42	33.49	9.55	19.40	0.50	ND*	ND*
12	10/05/2021	72.55	30.52	7.84	16.32	0.79	ND*	ND*
13	13/05/2021	60.24	20.53	10.34	17.53	0.58	ND*	ND*
14	19/05/2021	56.36	23.54	19.54	24.35	0.56	ND*	ND*
15	21/05/2021	65.31	34.62	12.40	28.26	0.55	ND*	ND*
16	24/05/2021	59.64	29.43	8.32	20.21	0.37	ND*	ND*
17	27/05/2021	53.41	21.62	11.32	30.34	0.82	ND*	ND*
18	31/05/2021	61.27	26.26	6.22	15.40	0.68	ND*	ND*
19	03/06/2021	71.23	33.41	11.61	20.34	0.31	ND*	ND*
20	07/06/2021	65.37	23.41	13.42	34.27	0.39	ND*	ND*
21	10/06/2021	58.65	26.59	15.30	31.42	0.32	ND*	ND*
22	14/06/2021	70.26	31.65	6.56	23.41	0.23	ND*	ND*
23	17/06/2021	55.31	28.56	8.33	16.56	0.62	ND*	ND*
24	21/06/2021	64.56	35.37	14.40	32.58	0.33	ND*	ND*
25	24/06/2021	52.47	39.30	10.40	35.35	0.68	ND*	ND*
26	28/06/2021	60.42	27.09	7.60	19.38	0.50	ND*	ND*
27	02/07/2021	94.36	55.35	13.40	27.55	0.48	ND*	ND*
28	05/07/2021	82.62	49.67	7.52	17.53	0.56	ND*	ND*
29	08/07/2021	91.36	56.86	9.64	22.6	0.42	ND*	ND*
30	12/07/2021	88.67	44.57	14.35	28.44	0.16	ND*	ND*

Continue …

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

ADANI HOUSE								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m^3	Particulate Matter (PM 2.5) µg/m^3	Sulphur Dioxide (SO2) µg/m^3	Oxides of Nitrogen (NO2) µg/m^3	Carbon Monoxide as CO mg/m^3	Hydrocarbon as CH_4 mg/m^3	Benzene as C_6H_6 µg/m^3
31	15/07/2021	92.36	53.35	12.35	24.68	0.39	ND*	ND*
32	19/07/2021	87.62	46.53	10.23	18.84	0.57	ND*	ND*
33	22/07/2021	93.62	41.52	8.56	21.32	0.46	ND*	ND*
34	26/07/2021	83.43	48.62	11.38	25.38	0.60	ND*	ND*
35	29/07/2021	71.28	35.66	6.39	31.81	0.55	ND*	ND*
36	02/08/2021	60.44	27.26	12.44	20.35	0.53	ND*	ND*
37	05/08/2021	65.16	24.54	15.68	31.31	0.27	ND*	ND*
38	09/08/2021	77.62	28.56	13.72	24.50	0.18	ND*	ND*
39	12/08/2021	69.54	21.41	17.55	29.35	0.50	ND*	ND*
40	16/08/2021	86.28	47.32	11.43	23.47	0.62	ND*	ND*
41	19/08/2021	70.61	29.48	9.45	21.29	0.25	ND*	ND*
42	23/08/2021	80.35	40.60	21.37	41.25	0.57	ND*	ND*
43	26/08/2021	87.62	57.32	16.48	30.40	0.29	ND*	ND*
44	30/08/2021	78.45	43.44	10.62	25.76	0.19	ND*	ND*
45	02/09/2021	67.52	28.43	6.56	18.85	0.49	ND*	ND*
46	06/09/2021	56.51	33.61	16.39	32.50	0.40	ND*	ND*
47	09/09/2021	76.38	38.46	9.35	25.35	0.26	ND*	ND*
48	23/09/2021	71.66	29.31	14.26	33.66	0.21	ND*	ND*
49	27/09/2021	58.45	23.62	10.24	36.50	0.13	ND*	ND*
LIMIT#		**100**	**60**	**80**	**80**	**4**	**Not Specified**	**5**
TEST METHOD		**IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)**	**Gravimetric-CPCB - Method (Vol.I,May-2011)**	**IS:5182(Part II):Improved West and Gaeke**	**IS:5182(Part VI):Modified Jacob &Hochheiser (NaOH-NaAsO2)**	**NDIR Digital Gas Analyzer**	**SOP: HC: GC/GCMS/Gas analyzer**	**IS 5182 (Part XI):2006/CPCB Method**

*Not Detected
#: Industrial, Residential, Rural and other Area Notification Dated 16th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

RESULT OF AMBIENT AIR QUALITY MONITORING

CT-3 RMU-2								
Sr.No.	Date of Sampling	Particulate Matter (PM10) µg/m³	Particulate Matter (PM 2.5) µg/m³	Sulphur Dioxide (SO2) µg/m³	Oxides of Nitrogen (NO2) µg/m³	Carbon Monoxide as CO mg/m³	Hydrocarbon as CH_4 mg/m³	Benzene as C_6H_6 µg/m³
1	02/04/2021	79.62	37.51	18.66	30.46	0.63	ND*	ND*
2	06/04/2021	93.52	47.62	22.50	38.43	0.46	ND*	ND*
3	09/04/2021	89.62	43.63	12.51	19.59	0.57	ND*	ND*
4	13/04/2021	77.52	38.43	15.40	31.56	0.30	ND*	ND*
5	16/04/2021	92.76	52.40	20.23	39.43	0.77	ND*	ND*
6	20/04/2021	88.24	42.29	8.60	20.62	0.23	ND*	ND*
7	22/04/2021	86.34	48.53	16.24	26.46	0.42	ND*	ND*
8	26/04/2021	94.38	53.61	19.37	22.47	0.50	ND*	ND*
9	29/04/2021	69.52	30.86	21.28	33.60	0.53	ND*	ND*
10	03/05/2021	80.36	44.50	22.62	34.66	0.50	ND*	ND*
11	07/05/2021	66.26	39.51	14.58	26.36	0.24	ND*	ND*
12	10/05/2021	71.86	41.55	16.52	22.64	0.62	ND*	ND*
13	13/05/2021	76.78	35.43	12.21	20.42	0.76	ND*	ND*
14	19/05/2021	82.42	52.61	17.54	27.69	0.34	ND*	ND*
15	21/05/2021	94.38	33.64	9.20	21.62	0.60	ND*	ND*
16	24/05/2021	72.62	50.53	10.87	23.41	0.52	ND*	ND*
17	27/05/2021	95.52	45.70	8.61	19.55	0.40	ND*	ND*
18	31/05/2021	83.42	55.56	15.84	35.22	0.38	ND*	ND*
19	03/06/2021	92.62	45.33	12.62	29.57	0.76	ND*	ND*
20	07/06/2021	85.35	42.67	9.66	22.53	0.65	ND*	ND*
21	10/06/2021	93.42	38.72	17.45	34.66	0.71	ND*	ND*
22	14/06/2021	83.42	50.32	11.63	25.41	0.82	ND*	ND*
23	17/06/2021	90.36	54.52	14.54	28.62	0.98	ND*	ND*
24	21/06/2021	43.61	20.34	16.56	23.70	0.45	ND*	ND*
25	24/06/2021	78.65	49.57	8.59	26.53	0.34	ND*	ND*
26	28/06/2021	94.28	55.35	15.23	30.55	0.60	ND*	ND*
27	02/07/2021	55.96	29.49	16.37	37.56	0.39	ND*	ND*
28	05/07/2021	73.55	36.43	18.56	33.43	0.52	ND*	ND*
29	08/07/2021	51.33	25.49	14.23	28.32	0.82	ND*	ND*
30	12/07/2021	84.35	39.47	17.61	31.58	0.34	ND*	ND*

Continue …

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

RESULT OF AMBIENT AIR QUALITY MONITORING

CT-3 RMU-2								
Sr.No.	**Date of Sampling**	**Particulate Matter (PM10) µg/m³**	**Particulate Matter (PM 2.5) µg/m³**	**Sulphur Dioxide (SO2) µg/m³**	**Oxides of Nitrogen (NO2) µg/m³**	**Carbon Monoxide as CO mg/m³**	**Hydrocarbon as CH_4 mg/m³**	**Benzene as C_6H_6 µg/m³**
31	15/07/2021	77.47	56.52	19.61	38.38	0.24	ND*	ND*
32	19/07/2021	71.36	32.44	12.84	26.40	0.64	ND*	ND*
33	22/07/2021	85.35	45.62	20.22	29.37	0.71	ND*	ND*
34	26/07/2021	78.26	42.63	10.35	34.54	0.54	ND*	ND*
35	29/07/2021	65.65	31.57	8.69	19.36	0.61	ND*	ND*
36	02/08/2021	81.37	48.41	14.37	28.47	0.71	ND*	ND*
37	05/08/2021	78.63	38.47	17.61	35.84	0.36	ND*	ND*
38	09/08/2021	85.64	44.58	19.29	31.31	0.22	ND*	ND*
39	12/08/2021	76.53	41.30	15.37	25.45	0.56	ND*	ND*
40	16/08/2021	90.34	52.57	18.64	39.49	0.47	ND*	ND*
41	19/08/2021	94.35	45.37	20.43	33.45	0.40	ND*	ND*
42	23/08/2021	89.42	51.36	13.94	30.42	0.64	ND*	ND*
43	26/08/2021	93.56	55.39	11.45	18.45	0.38	ND*	ND*
44	30/08/2021	88.43	53.48	16.86	34.54	0.33	ND*	ND*
45	02/09/2021	92.36	37.60	15.32	25.37	0.82	ND*	ND*
46	06/09/2021	80.35	45.37	19.60	36.35	0.61	ND*	ND*
47	09/09/2021	65.38	28.45	21.56	38.44	0.55	ND*	ND*
48	13/09/2021	78.36	43.42	16.33	34.22	0.47	ND*	ND*
49	16/09/2021	82.47	46.37	17.56	29.48	0.64	ND*	ND*
50	20/09/2021	90.33	48.32	8.64	18.62	0.50	ND*	ND*
51	23/09/2021	86.38	42.42	18.44	37.50	0.30	ND*	ND*
52	27/09/2021	70.31	35.43	22.46	40.33	0.66	ND*	ND*
53	30/09/2021	93.42	40.22	13.37	30.63	0.57	ND*	ND*
LIMIT#		**100**	**60**	**80**	**80**	**4**	**Not Specified**	**5**
TEST METHOD		**IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)**	**Gravimetric-CPCB - Method (Vol.I,May-2011)**	**IS:5182(Part II):Improved West and Gaeke**	**IS:5182(Part VI):Modified Jacob &Hochheiser (NaOH-NaAsO2)**	**NDIR Digital Gas Analyzer**	**SOP: HC: GC/GCMS/Gas analyzer**	**IS 5182 (Part XI):2006/CPCB Method**

*Not Detected
#: Industrial, Residential, Rural and other Area Notification Dated 16th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

RESULTS OF NOISE LEVEL MONITORING

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	ADANI PORT – TUG BERTH 600 KL PUPM HOUSE					
		Result [Leq dB(A)]					
	Sampling Date & Time	16/04/2021	24/05/2021	23/06/2021	19/07/2021	18/08/2021	17/09/2021
1	6:00-7:00	62.1	60.2	68.8	58.4	68.3	62.9
2	7:00-8:00	68.7	62.5	62.1	63.4	62.1	66.6
3	8:00-9:00	65.2	66.4	69.8	62.3	63.3	61.6
4	9:00-10:00	63.1	68.8	70.4	68.5	68.2	63.6
5	10:00-11:00	69.1	62.4	69.4	65.4	67.5	59.5
6	11:00-12:00	62.8	69.2	73.1	67.1	64.2	69.5
7	12:00-13:00	68.4	69.0	64.5	63.1	61.4	70.1
8	13:00-14:00	63.8	61.7	60.1	60.1	70.6	62.1
9	14:00-15:00	70.4	65.2	62.5	70.4	64.7	71.6
10	15:00-16:00	69.2	70.6	66.1	69.4	61.6	66.1
11	16:00-17:00	72.4	65.8	60.8	73.1	63.5	63.1
12	17:00-18:00	65.1	64.1	63.1	70.1	68.4	69.3
13	18:00-19:00	69.5	60.4	69.5	68.4	64.8	63.5
14	19:00-20:00	66.1	63.4	61.2	61.5	71.4	61.4
15	20:00-21:00	60.2	66.2	62.8	66.5	65.4	66.5
16	21:00-22:00	62.5	68.4	63.8	64.3	60.5	65.4
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	ADANI PORT – TUG BERTH 600 KL PUPM HOUSE					
		Result [Leq dB(A)]					
	Sampling Date & Time	16/04/2021	24/05/2021	23/06/2021	19/07/2021	18/08/2021	17/09/2021
1	22:00-23:00	65.5	68.4	63.1	57.4	63.3	64.4
2	23:00-00:00	62.6	63.2	65.8	56.8	66.2	68.4
3	00:00-01:00	60.1	62.4	64.4	61.2	61.4	62.1
4	01:00-02:00	56.8	60.1	60.2	62.8	65.2	63.1
5	02:00-03:00	62.1	62.5	59.8	58.8	63.4	65.8
6	03:00-04:00	63.1	64.8	55.1	63.1	67.1	60.4
7	04:00-05:00	64.8	63.8	62.5	65.4	62.8	63.2
8	05:00-06:00	61.2	65.4	61.5	65.1	63.8	62.6
Night Time Limit*		70 Leq dB(A)					

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

RESULTS OF NOISE LEVEL MONITORING

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	NEAR FIRE STATION					
		Result [Leq dB(A)]					
	Sampling Date & Time	28/04/2021	03/05/2021	10/06/2021	16/07/2021	25/08/2021	23/09/2021
1	6:00-7:00	67.1	65.2	64.5	63.5	60.1	64.7
2	7:00-8:00	62.4	69.9	60.1	68.2	69.9	64.6
3	8:00-9:00	69.1	72.1	62.4	60.7	66.3	63.3
4	9:00-10:00	62.5	70.6	62.5	64.5	69.4	66.4
5	10:00-11:00	67.4	65.4	65.3	61.2	63.6	68.3
6	11:00-12:00	62.1	61.2	68.4	61.3	61.2	69.1
7	12:00-13:00	63.5	63.5	67.1	60.6	71.5	62.4
8	13:00-14:00	68.1	68.1	66.1	68.3	64.5	62.3
9	14:00-15:00	65.1	61.4	63.5	72.1	65.5	61.8
10	15:00-16:00	64.1	59.4	62.8	69.9	68.6	64.2
11	16:00-17:00	60.2	66.2	61.5	69.3	61.7	62.2
12	17:00-18:00	68.4	69.4	63.1	65.5	62.6	61.3
13	18:00-19:00	63.4	62.8	65.4	61.4	62.8	68.8
14	19:00-20:00	69.4	60.5	63.2	66.2	63.8	64.0
15	20:00-21:00	61	63.4	62.7	62.8	60.8	64.1
16	21:00-22:00	62.8	61.8	65.5	61.9	62.9	60.3
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	NEAR FIRE STATION					
		Result [Leq dB(A)]					
	Sampling Date & Time	28/04/2021	03/05/2021	10/06/2021	16/07/2021	25/08/2021	23/09/2021
1	22:00-23:00	62.1	63.5	63.1	54.1	62.2	58.8
2	23:00-00:00	63.4	64.4	60.1	61.3	61.4	62.2
3	00:00-01:00	65.2	60.4	60.2	58.3	58.2	61.5
4	01:00-02:00	62.8	64.1	65.5	59.4	68.4	63.8
5	02:00-03:00	56.2	59.4	57.4	62.5	63.5	62.8
6	03:00-04:00	53.4	65.4	61.5	63.5	59.4	57.5
7	04:00-05:00	68.4	60.2	62.8	53.2	62.4	63.4
8	05:00-06:00	62.4	62.4	59.2	52.4	61.3	61.4
Night Time Limit*		70 Leq dB(A)					

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai
Lab Manager (Q)

RESULTS OF NOISE LEVEL MONITORING

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	ADANI HOUSE					
		Result [Leq dB(A)]					
	Sampling Date & Time	07/04/2021	17/05/2021	01/06/2021	05/07/2021	04/08/2021	23/09/2021
1	6:00-7:00	62.4	58.4	65.2	66.4	67.2	64.7
2	7:00-8:00	69.5	62.1	69.9	60.3	64.3	64.6
3	8:00-9:00	66.1	61.8	68.3	69.6	64.4	63.3
4	9:00-10:00	70.1	68.5	65.1	70.5	62.3	66.4
5	10:00-11:00	68.3	65.3	65.4	65.3	69.6	68.3
6	11:00-12:00	66.2	63.2	68.4	68.8	66.4	69.1
7	12:00-13:00	60.4	62.8	69.5	67.5	61.3	62.4
8	13:00-14:00	58.4	64.1	72.1	72.2	69.7	62.3
9	14:00-15:00	63.4	60.1	62.7	65.2	65.1	61.8
10	15:00-16:00	69.4	65.9	60.4	62.6	69.3	64.2
11	16:00-17:00	70.6	69.5	60.1	66.3	65.8	62.2
12	17:00-18:00	68.4	63.3	66.8	59.2	66.5	61.3
13	18:00-19:00	65.1	65.2	63.4	67.4	68	68.8
14	19:00-20:00	62.5	61.4	68.1	68.1	62.8	64.0
15	20:00-21:00	61.5	66.2	62.4	60.5	61.5	64.1
16	21:00-22:00	63.2	68.7	61.7	62.7	68.5	60.3
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	ADANI HOUSE					
		Result [Leq dB(A)]					
	Sampling Date & Time	07/04/2021	17/05/2021	01/06/2021	05/07/2021	04/08/2021	07/09/2021
1	22:00-23:00	65.4	65.8	65.1	63.6	64.4	62.3
2	23:00-00:00	60.1	60.2	69.5	53.5	65.3	68.5
3	00:00-01:00	58.4	58.8	62.4	60.2	60.9	66.8
4	01:00-02:00	56.1	57.4	64.1	55.4	66.1	60.8
5	02:00-03:00	60.7	62.4	59.3	57.7	59.4	62.4
6	03:00-04:00	63.5	64.1	68.4	61.4	62.4	61.2
7	04:00-05:00	61.2	59.8	64.5	68.4	61.5	65.6
8	05:00-06:00	68.4	60.9	62.8	58.7	63.2	67.4
Night Time Limit*		70 Leq dB(A)					

H. T. Shah
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POLLUCON LABORATORIES PVT. LTD. SURAT-7.

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Lab Manager (Q)

RESULTS OF NOISE LEVEL MONITORING

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	CT-3 RMU - 2					
		Result [LeqdB(A)]					
	Sampling Date & Time	12/04/2021	10/05/2021	04/06/2021	20/07/2021	10/08/2021	27/09/2021
1	6:00-7:00	57.4	56.1	60.4	48.9	58.4	57.4
2	7:00-8:00	62.1	62.4	64.5	55.4	55.1	63.2
3	8:00-9:00	56.1	59.1	68.4	59.7	65.3	60.8
4	9:00-10:00	62.5	65.7	62.1	58.3	70.5	66.0
5	10:00-11:00	65.4	57.4	66.2	53.4	63.1	64.9
6	11:00-12:00	68.4	63.4	67.8	62.5	62.7	66.2
7	12:00-13:00	60.1	66.3	69.4	63.3	62.5	69.4
8	13:00-14:00	63.1	68.5	70.4	56.9	66.2	70.5
9	14:00-15:00	60.2	65.2	69.5	51.8	60.4	69.9
10	15:00-16:00	65.8	62.3	65.2	67.3	63.4	72.8
11	16:00-17:00	61.6	68.4	61.4	69.8	70.7	67.9
12	17:00-18:00	66.2	69.4	60.3	57.8	66.1	63.7
13	18:00-19:00	58.7	64.2	63.5	61.8	62.8	65.1
14	19:00-20:00	64.1	61.5	66.8	63.2	69.8	65.7
15	20:00-21:00	60.8	68.1	62.4	52.7	62.4	68.4
16	21:00-22:00	62.8	60.9	59.4	48.7	61.8	67.4
Day Time Limit*		75LeqdB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	CT-3 RMU -2					
		Result [LeqdB(A)]					
	Sampling Date & Time	12/04/2021	10/05/2021	04/06/2021	20/07/2021	10/08/2021	27/09/2021
1	22:00-23:00	68.8	62.4	62.1	58.5	57.5	61.6
2	23:00-00:00	62.1	55.4	69.8	59.5	60.3	65.1
3	00:00-01:00	56.1	52.4	62.4	56.4	62.3	64.3
4	01:00-02:00	52.4	60.8	66.1	60.1	64.1	64.2
5	02:00-03:00	59.8	60.4	69.4	61.5	61.2	58.5
6	03:00-04:00	57.1	58.7	63.1	63.3	60.5	58.2
7	04:00-05:00	62.5	59.8	67.4	63.4	63.2	61.8
8	05:00-06:00	65.1	62.7	64.8	64.8	62.8	68.7
Night Time Limit*		70LeqdB(A)					

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

RESULT OF STACK MONITORING

SR. NO.	TEST PARAMETERS	UNIT	STD. LIMIT	THERMIC FLUID HEATER (BITUMEN-01)	THERMIC FLUID HEATER (BITUMEN-02)	HOT WATER SYSTEM-1	HOT WATER SYSTEM-2	TEST METHOD
				APRIL 2021				
1	Particulate Matter	mg/Nm^3	**150**	25.43	--	30.46	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	**100**	4.43	--	6.76	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	**50**	28.54	--	34.65	--	IS:11255 (Part-VII):2005
				MAY 2021				
1	Particulate Matter	mg/Nm^3	**150**	20.61	--	--	32.56	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	**100**	5.72	--	--	7.19	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	**50**	32.53	--	--	36.51	IS:11255 (Part-VII):2005
				JUNE 2021				
1	Particulate Matter	mg/Nm^3	**150**	--	--	26.41	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	**100**	--	--	5.56	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	**50**	--	--	30.37	--	IS:11255 (Part-VII):2005
				JULY 2021				
1	Particulate Matter	mg/Nm^3	**150**	25.61	--	33.44	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	**100**	6.67	--	7.46	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	**50**	29.38	--	33.64	--	IS:11255 (Part-VII):2005
				AUGUST 2021				
1	Particulate Matter	mg/Nm^3	**150**	23.42	--	--	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	**100**	5.52	--	--	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	**50**	26.80	--	--	--	IS:11255 (Part-VII):2005
				SEPTEMBER 2021				
1	Particulate Matter	mg/Nm^3	**150**	--	--	35.42	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	**100**	--	--	6.12	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	**50**	--	--	38.50	--	IS:11255 (Part-VII):2005

*Below detection limit

Results on 11 % O_2 Correction when Oxygen is greater than 11 %. And 12% CO_2correction when $CO_2$is less thsn 12%

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

RESULTS OF D.G. STACK MONITORING

24/09/2021							
SR. NO.	TEST PARAMETERS	Unit	South Basin CT-3			GPCB Limit	Test Method
			D.G. Set-1 (1500 KVA)	D.G. Set-2 (1500 KVA)	D.G. Set-3 (1500 KVA)		
1	Particulate Matter	mg/Nm^3	22.61	26.75	30.41	150	IS:11255 (Part-I):1985
2	Sulphur Dioxide	ppm	4.48	3.73	6.60	100	IS:11255 (Part-II):1985
3	Oxide of Nitrogen	ppm	30.76	34.54	36.78	50	IS:11255 (Part-VII):2005

*DG sets are used as standby, so stack monitoring is done on quarterly basis. Results on 15 % O2 Correction when Oxygen is greater than 15 %

14/07/2021							
SR. NO.	TEST PARAMETERS	Unit	South Basin CT-4			GPCB Limit	Test Method
			D.G. Set-1 (1500 KVA)	D.G. Set-2 (1500 KVA)	D.G. Set-3 (1500 KVA)		
1	Particulate Matter	mg/Nm^3	24.38	28.41	20.84	150	IS:11255 (Part-I):1985
2	Sulphur Dioxide	ppm	5.57	6.51	4.32	100	IS:11255 (Part-II):1985
3	Oxide of Nitrogen	ppm	31.52	34.54	32.59	50	IS:11255 (Part-VII):2005

*DG sets are used as standby, so stack monitoring is done on quarterly basis. Results on 15 % O2 Correction when Oxygen is greater than 15 %

H. T. Shah
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POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai
Lab Manager (Q)

28/08/2021							
SR. NO.	TEST PARAMETERS	Unit	Adani Port			GPCB Limit	Test Method
			D.G. Set-1 (500 KVA)	D.G. Set-2 (500 KVA)	D.G. Set-3 (500 KVA)		
1	Particulate Matter	mg/Nm^3	21.61	24.86	19.41	150	IS:11255 (Part-I):1985
2	Sulphur Dioxide	ppm	4.68	6.80	5.78	100	IS:11255 (Part-II):1985
3	Oxide of Nitrogen	ppm	31.84	35.44	33.82	50	IS:11255 (Part-VII):2005

28/08/2021						
SR. NO.	TEST PARAMETERS	Unit	Adani Port		GPCB Limit	Test Method
			D.G. Set-4 (500 KVA)	D.G. Set-5 (500 KVA)		
1	Particulate Matter	mg/Nm^3	22.46	25.42	150	IS:11255 (Part-I):1985
2	Sulphur Dioxide	ppm	7.71	5.44	100	IS:11255 (Part-II):1985
3	Oxide of Nitrogen	ppm	32.86	31.28	50	IS:11255 (Part-VII):2005

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

Minimum Detection Limit [MDL]

Ambient Air Parameters		
Sr. No.	**Test Parameter**	**MDL**
1	Particulate Matter (PM10) (µg/m^3)	10
2	Particulate Matter (PM 2.5) (µg/m^3)	10
3	Sulphur Dioxide (SO_2) (µg/m^3)	5
4	Oxides of Nitrogen (µg/m^3)	5
5	Hydrogen Sulphide as H_2S (µg/m^3)	6

Stack Parameters		
Sr.No.	**Test Parameter**	**MDL**
1	Particulate Matter (mg/Nm^3)	10
2	Sulphur Dioxide (ppm)	1.52
3	Oxides of Nitrogen (ppm)	2.65
4	Carbon Monoxide (mg/Nm^3)	0.1
5	Haydro Carbon NMHC (ppm)	1.0

Sea Water Parameters			
SR. NO.	**TEST PARAMETERS**	**UNIT**	**MDL**
1	pH	--	2
2	Temperature	°C	2
3	Total Suspended Solids	mg/L	2
4	BOD (3 Days @ 27 °C)	mg/L	1
5	Dissolved Oxygen	mg/L	0.1
6	Salinity	ppt	1
7	Oil & Grease	mg/L	2
8	Nitrate as NO_3	µmol/L	0.5
9	Nitrite as NO_2	µmol/L	0.01
10	Ammonical Nitrogen as NH_3	µmol/L	0.2
11	Phosphates as PO_4	µmol/L	0.5
12	Petroleum Hydrocarbon	µg/L	1
13	Total Dissolved Solids	mg/L	10
14	COD	mg/L	3
15	Primary productivity	mgC/L/day	0.1
16	Chlorophyll	mg/m^3	0.1
17	Phaeophytin	mg/m^3	0.1
18	Cell Count	No. x 10^3/L	1

Sea Sediment Parameters			
SR. NO.	**TEST PARAMETERS**	**UNIT**	**MDL**
1	Organic Matter	%	0.1
2	Phosphorus as P	µg/g	1
3	Petroleum Hydrocarbon	µg/g	1
4	Aluminum as Al	%	0.1
5	Manganese as Mn	µg/g	1
6	Mercury as Hg	µg/g	0.1

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai
Lab Manager (Q)

STP Water parameter(mg/L)		
Sr. No.	**Test parameter**	**MDL**
1	pH	2
2	Total Suspended Solids (mg/L)	2
3	BOD (3 days @ 270 C) (mg/L)	1
4	Residual Chlorine (mg/L)	0.2
5	Fecal Coliform (MPN INDEX/100 mL)	1.8

ETP Water Parameters			
SR. NO.	**TEST PARAMETERS**	**UNIT**	**MDL**
1	Colour	Co-pt	2
2	pH	--	2
3	Temperature	^{o}C	2
4	Total Suspended Solids	mg/L	2
5	Total Dissolved Solids	mg/L	10
6	COD	mg/L	3
7	BOD (3 Days @ 27 ^{o}C)	mg/L	1
8	Chloride as Cl	mg/L	1
9	Oil & Grease	mg/L	2
10	Sulphate as SO_4	mg/L	1
11	Ammonical Nitrogen as NH_3	mg/L	0.2
12	Phenolic Compound	mg/L	0.005
13	Copper as Cu	mg/L	0.01
14	Lead as Pb	mg/L	0.01
15	Sulphide as S	mg/L	0.1
16	Cadmium as Cd	mg/L	0.002
17	Fluoride as F	mg/L	0.05

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

"HALF YEARLYENVIRONMENTAL MONITORING REPORT"

FOR

BORE HOLE WATER
ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED
TAL: MUNDRA, KUTCH,MUNDRA – 370 421

MONITORING PERIOD:
APRIL 2021 TO SEPTEMBER 2021

PREPARED BY:

POLLUCON LABORATORIES PVT.LTD.

**PLOT NO.5/6 "POLLUCON HOUSE", OPP. BALAJI INDUSTRIAL SOCIETY,
OLD SHANTINATH SILK MILL LANE, NEAR GAYTRI FARSAN MART,
NAVJIVAN CIRCLE, UDHANA MAGDALLA ROAD, SURAT-395007.
PHONE/FAX – (+91 261) 2455 751, 2601 106, 2601 224.
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TC - 5945 ISO 9001:2015 ISO 14001:2015 ISO45001:2018

RESULTS OF BORE HOLE WATER

SR. NO	TEST PARAMETERS	UNIT	RESULTS			TEST METHOD
			PUMP HOUSE-1	PUMP HOUSE-2	PUMP HOUSE-3	
	Sampling Date		22/06/2021	22/06/2021	22/06/2021	
1	pH	--	7.89	8.35	8.01	IS 3025 (Part 5) 2017 Electrometric Method
2	Salinity	ppt	4.69	0.97	0.91	APHA 2520 B
3	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	APHA(23rd Edition) 5520 B 2017
4	Hydrocarbon	mg/L	Not Detected	Not Detected	Not Detected	GC/GC-MS
5	Lead as Pb	mg/L	0.037	0.032	0.042	APHA (23rd Edition) 3111 B 2017
6	Arsenic as As	mg/L	Not Detected	Not Detected	Not Detected	APHA (23rd Edition) 3114 B 2017
7	Nickel as Ni	mg/L	Not Detected	Not Detected	Not Detected	APHA (23rd Edition) 3111 B 2017
8	Total Chromium as Cr	mg/L	Not Detected	0.021	0.037	APHA (23rd Edition) 3111 B 2017
9	Cadmium as Cd	mg/L	Not Detected	Not Detected	Not Detected	APHA (23rd Edition) 3111 B 2017
10	Mercury as Hg	mg/L	Not Detected	Not Detected	Not Detected	APHA (23rd Edition) 3112 B 2017
11	Zinc as Zn	mg/L	Not Detected	0.35	0.14	APHA (23rd Edition) 3111 B 2017
12	Copper as Cu	mg/L	Not Detected	Not Detected	Not Detected	APHA (23rd Edition) 3111 B 2017
13	Iron as Fe	mg/L	0.28	2.62	2.76	APHA (23rd Edition) 3500 Fe B 2017
14	Insecticides/Pesticides	mg/L	Absent	Absent	Absent	GC/GC-MS
15	Depth of Water Level from Ground Level	meter	1.90	2.10	1.95	--

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai
Lab Manager (Q)

SR. NO	TEST PARAMETERS	UNIT	RESULTS		TEST METHOD
			UNLOADING BAYS	NEAR ETP	
	Sampling Date		22/06/2021	22/06/2021	
1	pH	--	7.93	7.94	IS 3025 (Part 5) 2017 Electrometric Method
2	Salinity	ppt	7.44	0.95	APHA 2520 B
3	Oil & Grease	mg/L	Not Detected	Not Detected	APHA(23rd Edition) 5520 B 2017
4	Hydrocarbon	mg/L	Not Detected	Not Detected	GC/GC-MS
5	Lead as Pb	mg/L	0.22	0.016	APHA (23rd Edition) 3111 B 2017
6	Arsenic as As	mg/L	Not Detected	Not Detected	APHA (23rd Edition) 3114 B 2017
7	Nickel as Ni	mg/L	Not Detected	Not Detected	APHA (23rd Edition) 3111 B 2017
8	Total Chromium as Cr	mg/L	Not Detected	0.024	APHA (23rd Edition) 3111 B 2017
9	Cadmium as Cd	mg/L	Not Detected	Not Detected	APHA (23rd Edition) 3111 B 2017
10	Mercury as Hg	mg/L	Not Detected	Not Detected	APHA (23rd Edition) 3112 B 2017
11	Zinc as Zn	mg/L	0.64	0.19	APHA (23rd Edition) 3111 B 2017
12	Copper as Cu	mg/L	Not Detected	Not Detected	APHA (23rd Edition) 3111 B 2017
13	Iron as Fe	mg/L	3.86	2.12	APHA (23rd Edition) 3500 Fe B 2017
14	Insecticides/Pesticides	mg/L	Absent	Absent	GC/GC-MS
15	Depth of Water Level from Ground Level	meter	2.15	2.0	--

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai
Lab Manager (Q)

Borehole Water Parameters			
SR. NO.	**TEST PARAMETERS**	**UNIT**	**MDL**
1	pH	--	2
2	Salinity	mg/L	0.5
3	Oil & Grease	mg/L	2
4	Hydrocarbon	mg/L	0.01
5	Lead as Pb	mg/L	0.005
6	Arsenic as As	mg/L	0.001
7	Nickel as Ni	mg/L	0.01
8	Total Chromium as Cr	mg/L	0.05
9	Cadmium as Cd	mg/L	0.002
10	Mercury as Hg	mg/L	0.0006
11	Zinc as Zn	mg/L	0.05
12	Copper as Cu	mg/L	0.02
13	Iron as Fe	mg/L	0.05
14	Insecticides/Pesticides	mg/L	0.1

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai

Lab Manager (Q)

"HALF YEARLYENVIRONMENTAL MONITORING REPORT"

FOR

WATER FRONT DEVELOPMENT PROJECT [WEST PORT]
ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED
TAL: MUNDRA, KUTCH, MUNDRA – 370 421

MONITORING PERIOD:
APRIL 2021 TO SEPTEMBER 2021

PREPARED BY:

POLLUCON LABORATORIES PVT.LTD.

**PLOT NO.5/6 "POLLUCON HOUSE", OPP. BALAJI INDUSTRIAL SOCIETY,
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TC - 5945 ISO 9001:2015 ISO 14001:2015 ISO45001:2018

RESULTS OF STP WATER OUTLET

SR. NO	TEST PARAMETERS	Unit	West Basin STP Outlet						GPCB permissible Limit	TEST METHOD
			APRIL-21		MAY-21		JUNE-21			
			09/04/2021	21/04/2021	06/05/2021	20/05/2021	05/06/2021	18/06/2021		
1	pH	--	7.63	7.53	7.89	7.94	7.58	7.72	**6.5 to 9.0**	IS3025(P11) 83Re.02
2	Total Suspended Solids	mg/L	12	16	13	16	12	15	**100**	IS3025(P17) 84Re.02
3	BOD (3 days @ 270 C)	mg/L	19	13	10	13.0	15	17	**30**	IS 3025 (P44)1993Re.03Edition2.1
4	Residual Chlorine	mg/L	0.6	0.7	0.8	0.7	0.6	0.8	**--**	APHA(22ndEdi)4500 Cl
5	Fecal Coliform	MPN/100 mL	430	350	540	350	430	540	**1000**	APHA (22ndEdi) 9221 C&E

SR. NO	TEST PARAMETERS	Unit	West Basin STP Outlet						GPCB permissible Limit	TEST METHOD
			JULY-21		AUGUST-21		SEPTEMBER-21			
			06/07/2021	16/07/2021	06/08/2021	16/08/2021	07/09/2021	24/09/2021		
1	pH	--	6.90	7.23	7.43	7.29	7.83	7.79	**6.5 to 9.0**	IS3025(P11) 83Re.02
2	Total Suspended Solids	mg/L	14	16	12	15	14	12	**100**	IS3025(P17) 84Re.02
3	BOD (3 days @ 270 C)	mg/L	11	13	17	11	19	15	**30**	IS 3025 (P44)1993Re.03Edition2.1
4	Residual Chlorine	mg/L	0.5	0.6	0.8	0.8	0.7	0.6	**--**	APHA(22ndEdi)4500 Cl
5	Fecal Coliform	MPN/100 mL	280	430	240	350	280	430	**1000**	APHA (22ndEdi) 9221 C&E

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai
Lab Manager (Q)

RESULT OF AMBIENT AIR QUALITY MONITORING

WEST PORT – PMC OFFICE								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m3	Particulate Matter (PM2.5) µg/m3	Sulphur Dioxide (SO2) µg/m3	Oxides of Nitrogen (NO2) µg/m3	Carbon Monoxide as (CO) mg/m3	Hydrocarbon as (CH4) mg/m3	Benzene as (C6H6) µg/m3
1	01/04/2021	69.43	36.43	7.67	19.58	0.48	ND*	ND*
2	05/04/2021	81.52	42.64	11.23	24.35	0.58	ND*	ND*
3	08/04/2021	88.67	45.60	8.60	36.26	0.45	ND*	ND*
4	12/04/2021	68.51	38.52	13.55	32.42	0.41	ND*	ND*
5	15/04/2021	83.83	47.56	12.53	22.59	0.60	ND*	ND*
6	19/04/2021	70.60	34.72	16.54	33.50	0.39	ND*	ND*
7	22/04/2021	62.62	40.35	18.65	25.23	0.56	ND*	ND*
8	26/04/2021	67.61	31.80	10.19	29.48	0.65	ND*	ND*
9	29/04/2021	80.60	37.77	14.26	26.36	0.52	ND*	ND*
10	03/05/2021	67.42	39.52	18.51	28.62	0.36	ND*	ND*
11	07/05/2021	72.24	35.22	12.66	33.53	0.26	ND*	ND*
12	10/05/2021	60.52	33.47	13.45	26.59	0.37	ND*	ND*
13	13/05/2021	78.55	29.76	11.51	23.42	0.62	ND*	ND*
14	19/05/2021	90.52	42.31	15.35	37.54	0.53	ND*	ND*
15	21/05/2021	51.24	38.60	7.62	20.60	0.71	ND*	ND*
16	24/05/2021	71.13	32.43	21.26	34.53	0.42	ND*	ND*
17	27/05/2021	68.62	37.60	19.22	32.48	0.70	ND*	ND*
18	31/05/2021	70.19	34.56	16.56	30.46	0.60	ND*	ND*
19	03/06/2021	66.57	33.68	10.53	32.45	0.74	ND*	ND*
20	07/06/2021	87.56	46.56	11.52	36.54	0.63	ND*	ND*
21	10/06/2021	41.52	25.34	15.20	28.34	0.54	ND*	ND*
22	14/06/2021	46.22	22.51	12.55	33.51	0.41	ND*	ND*
23	17/06/2021	51.23	30.30	14.24	26.55	0.48	ND*	ND*
24	21/06/2021	61.55	35.47	13.62	34.58	0.49	ND*	ND*
25	28/06/2021	57.62	40.22	18.34	31.59	0.80	ND*	ND*
26	02/07/2021	70.65	35.64	12.59	31.54	0.63	ND*	ND*
27	05/07/2021	90.46	55.40	20.34	38.47	0.44	ND*	ND*
28	08/07/2021	75.62	53.60	18.31	25.31	0.32	ND*	ND*
29	12/07/2021	87.63	47.35	11.68	19.63	0.53	ND*	ND*
30	15/07/2021	91.53	45.68	13.84	28.69	0.39	ND*	ND*

Continue...

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

WEST PORT – PMC OFFICE								
Sr. No.	**Date of Sampling**	**Particulate Matter (PM10) µg/m3**	**Particulate Matter (PM2.5) µg/m3**	**Sulphur Dioxide (SO2) µg/m3**	**Oxides of Nitrogen (NO2) µg/m3**	**Carbon Monoxide as (CO) mg/m3**	**Hydrocarbon as (CH4) mg/m3**	**Benzene as (C6H6) µg/m3**
31	19/07/2021	88.68	39.60	16.39	24.26	0.57	ND*	ND*
32	22/07/2021	78.42	34.35	10.36	15.55	0.69	ND*	ND*
33	26/07/2021	80.38	48.31	14.27	30.50	0.74	ND*	ND*
34	29/07/2021	77.52	52.40	17.54	33.45	0.52	ND*	ND*
35	02/08/2021	73.56	36.47	15.40	32.35	0.54	ND*	ND*
36	05/08/2021	82.36	53.44	11.23	26.37	0.36	ND*	ND*
37	09/08/2021	77.62	42.64	13.54	23.62	0.79	ND*	ND*
38	12/08/2021	86.36	49.35	18.64	33.43	0.76	ND*	ND*
39	16/08/2021	60.36	32.43	30.55	16.34	0.70	ND*	ND*
40	19/08/2021	79.42	43.56	8.65	18.65	0.61	ND*	ND*
41	23/08/2021	83.42	30.47	16.30	29.47	0.53	ND*	ND*
42	26/08/2021	90.36	44.27	10.39	20.41	0.48	ND*	ND*
43	30/08/2021	81.36	40.35	19.58	35.43	0.60	ND*	ND*
44	02/09/2021	76.30	38.47	17.68	31.61	0.69	ND*	ND*
45	06/09/2021	71.50	43.68	19.66	37.52	0.62	ND*	ND*
46	09/09/2021	62.34	40.22	14.35	27.53	0.57	ND*	ND*
47	13/09/2021	82.32	52.44	21.19	34.24	0.40	ND*	ND*
48	16/09/2021	75.47	48.35	15.36	26.45	0.80	ND*	ND*
49	20/09/2021	80.41	41.39	12.48	32.34	0.54	ND*	ND*
50	23/09/2021	89.34	50.35	20.21	23.64	0.87	ND*	ND*
51	27/09/2021	72.41	31.35	16.36	35.48	0.82	ND*	ND*
LIMIT#		**100**	**60**	**80**	**80**	**4**	**Not Specified**	**5**
TEST METHOD		**IS:5182 (Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)**	**Gravimetric-CPCB - Method (Vol.I,May-2011)**	**IS:5182(Part II):Improved West and Gaeke**	**IS:5182(Part VI):Modified Jacob &Hochheiser (NaOH-NaAsO2)**	**NDIR Digital Gas Analyzer**	**SOP: HC: GC/GCMS/Gas analyzer**	**IS 5182 (Part XI):2006/CPCB Method**

*Not Detected
#: Industrial, Residential, Rural and other Area Notification Dated 16th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

WEST PORT - HORTI CULTURE CABIN								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m3	Particulate Matter (PM2.5) µg/m3	Sulphur Dioxide (SO2) µg/m3	Oxides of Nitrogen (NO2) µg/m3	Carbon Monoxide as (CO) mg/m3	Hydrocarbon as (CH4) mg/m3	Benzene as (C6H6) µg/m3
1	01/04/2021	55.61	23.39	9.54	27.66	0.86	ND*	ND*
2	05/04/2021	70.23	27.55	8.60	20.26	0.88	ND*	ND*
3	08/04/2021	64.26	31.26	15.38	24.59	0.77	ND*	ND*
4	12/04/2021	58.25	28.47	17.51	25.37	0.37	ND*	ND*
5	15/04/2021	76.26	44.20	19.26	38.40	0.65	ND*	ND*
6	19/04/2021	69.46	38.62	10.22	26.37	0.61	ND*	ND*
7	22/04/2021	75.57	43.54	16.43	22.32	0.46	ND*	ND*
8	26/04/2021	67.59	35.67	12.54	21.58	0.30	ND*	ND*
9	29/04/2021	71.58	30.26	18.50	30.56	0.56	ND*	ND*
10	03/05/2021	62.44	34.55	11.58	21.37	0.32	ND*	ND*
11	07/05/2021	79.44	42.37	18.25	30.24	0.52	ND*	ND*
12	10/05/2021	55.56	28.55	6.79	17.53	0.55	ND*	ND*
13	13/05/2021	66.22	32.67	9.30	20.56	0.47	ND*	ND*
14	19/05/2021	70.51	37.67	20.70	29.50	0.39	ND*	ND*
15	21/05/2021	63.67	30.42	16.18	25.39	0.46	ND*	ND*
16	24/05/2021	51.58	25.68	14.52	31.52	0.23	ND*	ND*
17	27/05/2021	61.56	33.59	13.51	19.66	0.29	ND*	ND*
18	31/05/2021	58.36	26.47	10.25	22.62	0.33	ND*	ND*
19	03/06/2021	53.36	22.52	12.38	23.53	0.40	ND*	ND*
20	07/06/2021	60.57	34.55	14.55	28.32	0.45	ND*	ND*
21	10/06/2021	46.38	30.59	13.44	20.51	0.49	ND*	ND*
22	14/06/2021	40.22	17.56	17.29	27.58	0.27	ND*	ND*
23	17/06/2021	63.58	20.23	6.58	22.34	0.60	ND*	ND*
24	21/06/2021	72.47	32.42	9.52	26.37	0.36	ND*	ND*
25	28/06/2021	67.69	36.50	15.33	24.37	0.57	ND*	ND*
26	02/07/2021	76.52	31.63	8.46	18.48	0.55	ND*	ND*
27	05/07/2021	66.56	38.62	16.41	26.35	0.64	ND*	ND*
28	08/07/2021	70.36	35.38	14.58	22.39	0.50	ND*	ND*
29	12/07/2021	78.39	43.54	12.61	28.52	0.58	ND*	ND*
30	15/07/2021	67.53	30.38	10.55	17.56	0.46	ND*	ND*

Continue...

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

WEST PORT - HORTI CULTURE CABIN								
Sr. No.	**Date of Sampling**	**Particulate Matter (PM10) µg/m3**	**Particulate Matter (PM2.5) µg/m3**	**Sulphur Dioxide (SO2) µg/m3**	**Oxides of Nitrogen (NO2) µg/m3**	**Carbon Monoxide as (CO) mg/m3**	**Hydrocarbon as (CH4) mg/m3**	**Benzene as (C6H6) µg/m3**
31	19/07/2021	77.52	34.67	11.26	21.56	0.63	ND*	ND*
32	22/07/2021	60.31	24.51	17.67	19.69	0.52	ND*	ND*
33	26/07/2021	75.64	32.42	10.22	16.35	0.44	ND*	ND*
34	29/07/2021	81.58	39.50	13.29	27.50	0.37	ND*	ND*
LIMIT#		**100**	**60**	**80**	**80**	**4**	**Not Specified**	**5**
TEST METHOD		**IS:5182 (Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)**	**Gravimetric-CPCB - Method (Vol.I,May-2011)**	**IS:5182(Part II):Improved West and Gaeke**	**IS:5182(Part VI):Modified Jacob &Hochheiser (NaOH-NaAsO2)**	**NDIR Digital Gas Analyzer**	**SOP: HC: GC/GCMS/Gas analyzer**	**IS 5182 (Part XI):2006/CPCB Method**

*Not Detected
#: Industrial, Residential, Rural and other Area Notification Dated 16th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

WEST PORT - WEST BASIN MAIN GATE								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m3	Particulate Matter (PM2.5) µg/m3	Sulphur Dioxide (SO2) µg/m3	Oxides of Nitrogen (NO2) µg/m3	Carbon Monoxide as (CO) mg/m3	Hydrocarbon as (CH4) mg/m3	Benzene as (C6H6) µg/m3
1	01/04/2021	72.62	31.64	17.26	30.35	0.95	ND*	ND*
2	05/04/2021	86.84	44.23	13.31	27.56	0.73	ND*	ND*
3	08/04/2021	93.54	50.38	11.24	17.57	0.54	ND*	ND*
4	12/04/2021	78.20	33.58	21.22	28.31	0.47	ND*	ND*
5	15/04/2021	87.59	52.41	16.21	32.58	0.76	ND*	ND*
6	19/04/2021	76.52	43.57	18.24	37.28	0.85	ND*	ND*
7	22/04/2021	80.50	48.24	14.28	31.53	0.71	ND*	ND*
8	26/04/2021	94.55	39.23	19.24	34.52	0.60	ND*	ND*
9	29/04/2021	88.52	34.24	12.49	24.52	0.69	ND*	ND*
10	03/05/2021	90.36	42.62	14.58	25.30	0.49	ND*	ND*
11	07/05/2021	84.62	48.53	22.61	36.59	0.88	ND*	ND*
12	10/05/2021	74.62	38.61	17.26	32.56	0.94	ND*	ND*
13	13/05/2021	89.52	45.64	15.22	24.53	0.76	ND*	ND*
14	19/05/2021	94.32	54.31	13.65	40.56	0.82	ND*	ND*
15	21/05/2021	87.52	32.38	11.22	33.44	0.66	ND*	ND*
16	24/05/2021	76.30	37.62	12.64	37.52	0.53	ND*	ND*
17	27/05/2021	93.62	55.34	20.28	42.44	0.98	ND*	ND*
18	31/05/2021	77.26	41.51	16.73	38.65	0.42	ND*	ND*
19	03/06/2021	73.62	38.57	15.32	26.59	0.78	ND*	ND*
20	07/06/2021	81.23	41.22	17.52	31.56	0.57	ND*	ND*
21	10/06/2021	62.48	35.27	9.67	16.56	0.64	ND*	ND*
22	14/06/2021	57.62	32.54	14.38	23.43	0.87	ND*	ND*
23	17/06/2021	95.35	42.58	16.24	19.56	0.92	ND*	ND*
24	21/06/2021	84.36	50.51	19.55	38.55	0.89	ND*	ND*
25	28/06/2021	90.36	54.68	21.23	36.32	0.86	ND*	ND*
26	02/07/2021	85.62	48.36	14.25	35.67	0.80	ND*	ND*
27	05/07/2021	92.36	52.66	18.55	42.68	0.98	ND*	ND*
28	08/07/2021	83.36	42.66	26.36	38.64	0.76	ND*	ND*
29	12/07/2021	93.62	37.62	19.62	31.56	0.66	ND*	ND*
30	15/07/2021	88.63	49.27	17.22	22.60	0.81	ND*	ND*

Continue...

H. T. Shah

Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai

Lab Manager (Q)

WEST PORT - WEST BASIN MAIN GATE								
Sr. No.	**Date of Sampling**	**Particulate Matter (PM10) µg/m3**	**Particulate Matter (PM2.5) µg/m3**	**Sulphur Dioxide (SO2) µg/m3**	**Oxides of Nitrogen (NO2) µg/m3**	**Carbon Monoxide as (CO) mg/m3**	**Hydrocarbon as (CH4) mg/m3**	**Benzene as (C6H6) µg/m3**
31	19/07/2021	94.52	51.62	20.35	28.56	0.73	ND*	ND*
32	22/07/2021	84.62	46.38	15.66	25.31	0.82	ND*	ND*
33	26/07/2021	91.42	56.54	24.50	34.30	0.95	ND*	ND*
34	29/07/2021	86.36	50.34	21.57	36.54	0.71	ND*	ND*
35	02/08/2021	81.36	46.25	12.50	27.58	0.71	ND*	ND*
36	05/08/2021	94.36	50.34	16.36	24.55	0.85	ND*	ND*
37	09/08/2021	85.38	47.54	19.38	25.38	1.02	ND*	ND*
38	12/08/2021	74.36	44.23	22.33	29.32	0.93	ND*	ND*
39	16/08/2021	86.43	41.26	18.27	23.50	0.77	ND*	ND*
40	19/08/2021	90.34	37.54	15.43	26.40	0.81	ND*	ND*
41	23/08/2021	88.36	43.57	21.54	36.54	0.62	ND*	ND*
42	26/08/2021	83.42	40.35	17.56	32.37	0.86	ND*	ND*
43	30/08/2021	93.45	48.36	23.46	38.44	1.05	ND*	ND*
44	02/09/2021	84.68	44.36	14.42	25.66	0.82	ND*	ND*
45	06/09/2021	79.50	48.40	17.25	33.45	0.79	ND*	ND*
LIMIT#		**100**	**60**	**80**	**80**	**4**	**Not Specified**	**5**
TEST METHOD		**IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)**	**Gravimetric-CPCB - Method (Vol.I,May-2011)**	**IS:5182 (Part II):Improved West and Gaeke**	**IS:5182 (Part VI):Modified Jacob &Hochheiser (NaOH-NaAsO2)**	**NDIR Digital Gas Analyzer**	**SOP: HC: GC/GCMS/Gas analyzer**	**IS 5182 (Part XI):2006/CPCB Method**

*Not Detected
#: Industrial, Residential, Rural and other Area Notification Dated 16th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

RESULTS OF NOISE LEVEL MONITORING

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	WEST PORT - PMC OFFICE					
		Result [Leq dB(A)]					
	Sampling Date & Time	02/04/2021	07/05/2021	11/06/2021	21/07/2021	20/08/2021	10/09/2021
1	6:00-7:00	65.6	60.1	65.4	60.4	67.5	60.9
2	7:00-8:00	61.0	65.4	68.7	54.1	68.6	62.1
3	8:00-9:00	63.4	65.2	62.4	53.7	73.5	63.8
4	9:00-10:00	60.1	64.2	60.7	63.5	65.5	65.8
5	10:00-11:00	58.4	63.5	63.8	66.3	66.8	71.5
6	11:00-12:00	62.7	68.4	67.4	61.2	69.4	71.4
7	12:00-13:00	68.4	60.7	69.6	68.1	64.1	65.1
8	13:00-14:00	61.4	61.4	65.8	62.9	60.9	69.5
9	14:00-15:00	60.8	62.6	68.4	69.4	65.6	63.1
10	15:00-16:00	59.4	66.2	65.1	64.2	69.2	62.4
11	16:00-17:00	56.1	63.4	66.3	60.5	71.6	68.2
12	17:00-18:00	62.4	61.2	69.4	63.6	68.4	70.5
13	18:00-19:00	69.1	62.8	72.9	70.4	62.5	65.2
14	19:00-20:00	66.1	69.4	70.6	65.1	61.4	63.2
15	20:00-21:00	61.2	64.1	58.4	63.8	61.5	69.6
16	21:00-22:00	65.4	62.5	61.2	64.1	60.8	66.4
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	WEST PORT - PMC OFFICE					
		Result [Leq dB(A)]					
	Sampling Date & Time	02/04/2021	07/05/2021	11/06/2021	21/07/2021	20/08/2021	10/09/2021
1	22:00-23:00	60.1	65.5	68.4	68.4	65.1	66.4
2	23:00-00:00	63.5	59.4	54.5	55.2	60.1	63.9
3	00:00-01:00	55.1	62.4	62.5	60.2	58.7	64.6
4	01:00-02:00	61.5	63.1	63.5	58.6	56.2	65.5
5	02:00-03:00	56.8	64.7	66.8	64.1	62.4	61.3
6	03:00-04:00	62.1	66.2	62.4	60.3	59.8	60.9
7	04:00-05:00	63.4	62.9	61.4	62.5	63.1	67.1
8	05:00-06:00	60.8	61.5	62.8	61.8	60.8	66.2
Night Time Limit*		70 Leq dB(A)					

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai
Lab Manager (Q)

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	WEST PORT - HORTI CULTURE CABIN					
		Result [Leq dB(A)]					
	Sampling Date & Time	23/04/2021	18/05/2021	18/06/2021	13/07/2021	13/08/2021	13/09/2021
1	6:00-7:00	60.4	63.1	70.4	56.4	56.1	64.4
2	7:00-8:00	57.4	60.5	62.4	62.4	62.1	68.4
3	8:00-9:00	62.5	70.5	61.8	61.1	59.4	66.7
4	9:00-10:00	65.5	69.4	64.8	63.2	64.4	63.6
5	10:00-11:00	63.8	71.2	65.1	69.6	60.3	60.8
6	11:00-12:00	68.5	65.2	61.9	67.3	65.8	69.9
7	12:00-13:00	69.4	61.2	62.8	60.2	69.5	66.1
8	13:00-14:00	64.2	68.4	64.7	59.5	66.4	62.5
9	14:00-15:00	65.2	63.2	69.1	66.8	61.6	61.2
10	15:00-16:00	61.2	64.1	60.4	67.4	66.3	69.4
11	16:00-17:00	60.8	68.5	68.5	61.5	65.7	65.3
12	17:00-18:00	66.4	66.2	65.4	63.4	62.3	66.8
13	18:00-19:00	70.1	60.4	63.8	68.5	64.6	70.2
14	19:00-20:00	63.1	68.0	72.4	65.4	65.4	68.5
15	20:00-21:00	61.8	62.4	62.5	65.5	61.2	64.1
16	21:00-22:00	62.8	61.5	61.5	69.1	62.9	62.2
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	WEST PORT - HORTI CULTURE CABIN					
		Result [Leq dB(A)]					
	Sampling Date & Time	23/04/2021	18/05/2021	18/06/2021	13/07/2021	13/08/2021	13/09/2021
1	22:00-23:00	56.1	53.1	65.8	64.3	58.4	64.1
2	23:00-00:00	60.1	64.4	65.4	54.1	65.0	69.2
3	00:00-01:00	58.7	55.8	63.8	57.2	58.1	58.7
4	01:00-02:00	55.1	59.4	60.3	55.8	64.1	61.0
5	02:00-03:00	62.1	60.5	63.4	58.4	55.2	64.7
6	03:00-04:00	60.3	65.1	60.4	59.4	60.8	67.2
7	04:00-05:00	61.5	62.4	62.8	60.4	65.5	69.1
8	05:00-06:00	62.4	60.3	54.4	62.9	57.4	59.7
Night Time Limit*		70 Leq dB(A)					

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai
Lab Manager (Q)

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	WEST PORT - WEST BASIN MAIN GATE					
		Result [Leq dB(A)]					
	Sampling Date & Time	13/04/2021	14/05/2021	08/06/2021	09/07/2021	17/08/2021	21/09/2021
1	6:00-7:00	62.5	68.5	68.7	60.6	60.4	62.3
2	7:00-8:00	69.1	65.1	62.8	69.2	63.5	69.7
3	8:00-9:00	60.4	70.6	68.2	65.2	65.2	65.5
4	9:00-10:00	68.6	72.4	62.4	62.5	60.5	69.8
5	10:00-11:00	64.0	68.1	61.5	67.5	63.2	68.6
6	11:00-12:00	70.1	61.2	69.1	72.1	63.1	60.1
7	12:00-13:00	69.4	67.3	66.2	69.5	62.2	63.7
8	13:00-14:00	62.4	60.5	65.8	66.2	68.5	70.6
9	14:00-15:00	68.4	69.5	68.9	70.5	66.2	65.6
10	15:00-16:00	69.9	64.2	63.8	64.3	72.4	68.7
11	16:00-17:00	72.1	63.5	65.1	61.7	68.9	62.6
12	17:00-18:00	70.4	66.1	71.4	64.4	61.3	60.7
13	18:00-19:00	66.2	68.8	62.5	63.1	62.8	63.9
14	19:00-20:00	62.1	64.1	63.4	68.4	70.4	64.9
15	20:00-21:00	63.4	61.5	68.4	66.1	62.4	71.6
16	21:00-22:00	65.8	66.2	66.1	62.8	61.8	65.7
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	WEST PORT - WEST BASIN MAIN GATE					
		Result [Leq dB(A)]					
	Sampling Date & Time	13/04/2021	14/05/2021	08/06/2021	09/07/2021	17/08/2021	21/09/2021
1	22:00-23:00	62.1	65.4	65.3	57.5	62.1	60.6
2	23:00-00:00	60.6	62.8	65.2	61.5	59.4	64.8
3	00:00-01:00	59.4	63.1	61.5	62.6	63.3	66.9
4	01:00-02:00	63.1	61.1	62.5	69.5	61.5	59.5
5	02:00-03:00	61.8	68.4	68.4	66.1	64.2	66.3
6	03:00-04:00	65.2	60.1	63.4	62.4	62.5	64.5
7	04:00-05:00	61.5	59.8	62.8	65.2	64.1	63.6
8	05:00-06:00	60.8	62.4	60.4	63.4	61.2	61.1
Night Time Limit*		70 Leq dB(A)					

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai
Lab Manager (Q)

RESULTS OF D.G. STACK MONITORING

16/06/2021						
SR. NO.	TEST PARAMETERS	Unit	West Basin		GPCB Limit	Test Method
			D.G. Set-1 (1500 KVA)	D.G. Set-2 (1500 KVA)		
1	Particulate Matter	mg/Nm^3	27.52	23.62	150	IS:11255 (Part-I):1985
2	Sulphur Dioxide	ppm	6.57	5.48	100	IS:11255 (Part-II):1985
3	Oxide of Nitrogen	ppm	36.40	33.51	50	IS:11255 (Part-VII):2005

*DG sets are used as standby, so stack monitoring is done on quarterly basis. Results on 15 % O2 Correction when Oxygen is greater than 15 %

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai
Lab Manager (Q)

MINIMUM DETECTION LIMIT [MDL]

Ambient Air Parameter		
Sr. No.	**Test parameter**	**MDL**
1	Particulate Matter (PM10) ($\mu g/m^3$)	10
2	Particulate Matter (PM 2.5) ($\mu g/m^3$)	10
3	Sulphur Dioxide (SO_2) ($\mu g/m^3$)	5
4	Oxides of Nitrogen($\mu g/m^3$)	5
5	Carbon Monoxide as CO (mg/m^3)	0.1
6	Hydrocarbon as CH_4 ($\mu g/m^3$)	150
7	Benzene as C_6H_6 (mg/m^3)	2

STP Water parameter(mg/L)		
Sr. No.	**Test parameter**	**MDL**
1	pH	2
2	Total Suspended Solids (mg/L)	2
3	BOD (3 days @ 270 C) (mg/L)	1
4	Residual Chlorine (mg/L)	0.2
5	Fecal Coliform (MPN INDEX/100 mL)	1.8

Stack Parameters		
Sr.No.	**Test Parameter**	**MDL**
1	Particulate Matter (mg/Nm^3)	10
2	Sulphur Dioxide (ppm)	1.52
3	Oxides of Nitrogen (ppm)	2.65
4	Carbon Monoxide (mg/Nm^3)	0.1
5	Haydro Carbon NMHC (ppm)	1.0

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. ArunBajpai
Lab Manager (Q)

"HALF YEARLYENVIRONMENTAL MONITORING REPORT"

FOR

MUNDRA LPG TERMINAL PVT.LTD.
NEAR PLOT NO. 169/P, NAVINAL ISLAND,
TAL: MUNDRA, KUTCH, MUNDRA – 370 421

MONITORING PERIOD:

APRIL 2021 TO SEPTEMBER 2021

PREPARED BY:

POLLUCON LABORATORIES PVT.LTD.

**PLOT NO.5/6 "POLLUCON HOUSE", OPP. BALAJI INDUSTRIAL SOCIETY,
OLD SHANTINATH SILK MILL LANE, NEAR GAYTRI FARSAN MART,
NAVJIVAN CIRCLE, UDHANA MAGDALLA ROAD, SURAT-395007.
PHONE/FAX – (+91 261) 2455 751, 2601 106, 2601 224.
E-mail: pollucon@gmail.com Web: www.polluconlab.com**

TC - 5945 ISO 9001:2015 ISO 14001:2015 ISO45001:2018

RESULT OF AMBIENT AIR QUALITY MONITORING

LPG TERMINAL								
Sr. No	Date of Sampling	Particulate Matter (PM10) µg/m³	Particulate Matter (PM 2.5) µg/m³	Sulphur Dioxide (SO2) µg/m³	Oxides of Nitrogen (NO2) µg/m³	Carbon Monoxide as CO mg/m³	Hydrocarbon as CH_4 mg/m³	Benzene as C_6H_6 µg/m³
1	02/04/2021	84.36	46.33	9.58	21.58	0.68	ND*	ND*
2	06/04/2021	78.62	53.40	14.60	26.36	0.21	ND*	ND*
3	09/04/2021	83.28	30.61	10.46	22.48	0.70	ND*	ND*
4	13/04/2021	61.52	25.51	19.47	35.61	0.44	ND*	ND*
5	16/04/2021	85.76	45.41	16.44	25.57	0.45	ND*	ND*
6	20/04/2021	56.52	39.52	12.35	29.54	0.25	ND*	ND*
7	22/04/2021	51.52	34.29	7.65	16.57	0.39	ND*	ND*
8	26/04/2021	82.52	49.43	13.50	19.51	0.27	ND*	ND*
9	29/04/2021	87.82	42.53	17.24	27.55	0.33	ND*	ND*
10	03/05/2021	88.62	38.64	19.31	31.54	0.53	ND*	ND*
11	07/05/2021	95.62	49.43	11.85	22.55	0.64	ND*	ND*
12	10/05/2021	82.62	53.44	9.32	18.33	0.45	ND*	ND*
13	13/05/2021	87.62	50.43	14.37	25.64	0.72	ND*	ND*
14	19/05/2021	94.35	47.50	15.66	21.59	0.22	ND*	ND*
15	21/05/2021	78.62	21.58	6.56	24.59	0.36	ND*	ND*
16	24/05/2021	86.72	33.66	16.45	27.49	0.23	ND*	ND*
17	27/05/2021	70.36	36.59	12.56	23.65	0.61	ND*	ND*
18	31/05/2021	68.36	32.41	10.57	17.53	0.29	ND*	ND*
19	03/06/2021	63.52	40.56	9.55	23.59	0.4	ND*	ND*
20	07/06/2021	78.36	37.55	7.56	18.27	0.42	ND*	ND*
21	10/06/2021	70.36	27.6	13.58	24.49	0.78	ND*	ND*
22	14/06/2021	72.62	44.54	15.82	33.8	0.61	ND*	ND*
23	17/06/2021	77.58	40.65	12.62	22.64	0.55	ND*	ND*
24	21/06/2021	60.52	27.31	8.60	20.67	0.27	ND*	ND*
25	24/06/2021	62.43	30.61	11.32	32.44	0.57	ND*	ND*
26	28/06/2021	71.36	33.62	17.70	35.62	0.46	ND*	ND*
27	02/07/2021	77.57	36.30	18.31	31.52	0.34	ND*	ND*
28	05/07/2021	68.35	31.53	16.31	28.47	0.31	ND*	ND*
29	08/07/2021	80.37	38.43	11.65	25.37	0.19	ND*	ND*
30	12/07/2021	92.33	43.53	7.63	15.61	0.36	ND*	ND*

Continue…

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

LPG TERMINAL								
Sr. No	Date of Sampling	Particulate Matter (PM10) µg/m³	Particulate Matter (PM 2.5) µg/m³	Sulphur Dioxide (SO2) µg/m³	Oxides of Nitrogen (NO2) µg/m³	Carbon Monoxide as CO mg/m³	Hydrocarbon as CH_4 mg/m³	Benzene as C_6H_6 µg/m³
31	15/07/2021	81.21	39.43	17.61	30.23	0.13	ND*	ND*
32	19/07/2021	64.34	35.38	15.29	34.49	0.17	ND*	ND*
33	22/07/2021	57.53	32.41	6.54	17.63	0.21	ND*	ND*
34	26/07/2021	72.48	34.37	9.61	23.35	0.27	ND*	ND*
35	29/07/2021	52.32	20.36	14.54	26.88	0.44	ND*	ND*
36	02/08/2021	69.45	34.58	6.87	15.64	0.57	ND*	ND*
37	05/08/2021	82.58	21.54	8.55	21.52	0.45	ND*	ND*
38	09/08/2021	70.38	24.8	10.33	26.38	0.3	ND*	ND*
39	12/08/2021	64.53	36.34	12.67	23.43	0.42	ND*	ND*
40	16/08/2021	80.31	42.49	16.53	30.35	0.34	ND*	ND*
41	19/08/2021	72.31	48.34	14.28	25.45	0.23	ND*	ND*
42	23/08/2021	68.46	23.46	18.29	35.39	0.17	ND*	ND*
43	26/08/2021	76.92	39.48	7.53	22.39	0.44	ND*	ND*
44	30/08/2021	81.6	46.33	11.33	17.5	0.14	ND*	ND*
45	02/09/2021	79.36	33.5	12.38	21.65	0.46	ND*	ND*
46	06/09/2021	67.31	37.55	14.38	28.7	0.54	ND*	ND*
47	09/09/2021	89.62	35.63	17.54	35.39	0.48	ND*	ND*
48	13/09/2021	92.42	45.62	19.35	31.4	0.31	ND*	ND*
49	16/09/2021	75.34	32.41	13.28	20.85	0.49	ND*	ND*
50	20/09/2021	80.31	44.66	16.51	23.6	0.36	ND*	ND*
51	23/09/2021	48.36	20.36	10.67	19.48	0.24	ND*	ND*
52	27/09/2021	62.46	29.44	20.27	30.27	0.27	ND*	ND*
53	30/09/2021	76.33	22.41	6.33	15.33	0.42	ND*	ND*
LIMIT#		**100**	**60**	**80**	**80**	**4**	**Not Specifed**	**5**
TEST METHOD		**IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)**	**Gravimetric-CPCB - Method (Vol.I,May-2011)**	**IS:5182(Part II):Improved West and Gaeke**	**IS:5182(Part VI):Modified Jacob &Hochheiser (NaOH-NaAsO2)**	**NDIR Digital Gas Analyzer**	**SOP: HC: GC/GCMS/Gas analyzer**	**IS 5182 (Part XI):2006/CPCB Method**

*NotDetected
#: Industrial, Residential, Rural and other Area Notification Dated 16th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

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Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

Dr. ArunBajpai
Lab Manager (Q)

RESULT OF LPG TERMINAL N-PIT SAMPLE

SR. NO.	TEST PARAMETERS	UNIT	LPG terminal N-pit Sample						GPCB Permissible Limit
			Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	
1	Colour	co-pt	30	20	20	30	25	30	--
2	pH	--	7.84	7.31	7.46	7.75	7.18	7.7	6.5 to 8.5
3	Temperature	°C	30.8	30.4	30	30	29.9	29.8	--
4	Total Suspended Solids	mg/L	38	25	21	29	23	21	--
5	Total Dissolved Solids	mg/L	1484	1365	1319	1420	934	968	--
6	COD	mg/L	110	74	42	63	75	102	--
7	BOD (3 Days @ 27 °C)	mg/L	20	15.6	10.3	12	15	17	--
8	Chloride as Cl	mg/L	442	369	348	314	298	326	--
9	Oil & Grease	mg/L	3.4	4.5	4.0	2.7	3.3	4.1	--
10	Ammonical Nitrogen as NH_3	mg/L	5.8	4.86	3.75	3.28	3.95	4.72	--

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

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RESULTS OF NOISE LEVEL MONITORING

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	LPG TERMINAL WORKSHOP					
		Result [dB(A) Leq]					
	Sampling Date & Time	26/04/2021	08/05/2021	02/06/2021	02/07/2021	06/08/2021	08/09/2021
1	6:00-7:00	65.8	64.5	68.5	52.8	64.6	58.8
2	7:00-8:00	61.4	60.8	65.1	61.6	67.3	60.5
3	8:00-9:00	60.5	66.3	61.5	59.4	69.2	68.5
4	9:00-10:00	68.7	62.4	68.2	64.7	63.2	65.2
5	10:00-11:00	72.6	65.1	62.4	65.1	62.2	62.7
6	11:00-12:00	70.6	63.8	64.2	67.8	65.6	72.3
7	12:00-13:00	65.4	68.4	65.8	62.2	72.1	68.9
8	13:00-14:00	61.7	69.4	66.4	65.6	68.1	65.6
9	14:00-15:00	62.7	64.1	64.1	71.5	69.5	64.5
10	15:00-16:00	60.4	61.5	68.4	66.1	65.2	66.3
11	16:00-17:00	58.4	70.2	65.2	69.5	60.2	63.4
12	17:00-18:00	62.8	68.3	69.5	62.4	64.9	61.2
13	18:00-19:00	63.1	60.5	62.5	64.1	67.1	68.7
14	19:00-20:00	64.8	61.4	67.1	63.8	60.5	63.9
15	20:00-21:00	61.8	66.4	66.7	62.1	64.1	65.5
16	21:00-22:00	65.5	63.2	68.7	60.8	61.5	66.7
Day Time Limit*		75 dB(A) Leq					

Result of Noise level monitoring [Night Time]

	Name of Location	LPG TERMINAL WORKSHOP					
		Result [dB(A) Leq]					
	Sampling Date & Time	26/04/2021	08/05/2021	02/06/2021	02/07/2021	06/08/2021	08/09/2021
1	22:00-23:00	64.1	60.4	68.4	60.3	60.1	62.5
2	23:00-00:00	61.5	66.1	64.1	54.5	65.4	67.3
3	00:00-01:00	59.5	61.5	62.1	51.2	58.5	56.7
4	01:00-02:00	58.4	68.7	63.1	62.1	65.1	67.8
5	02:00-03:00	62.1	59.8	62.4	64.4	60.2	65.2
6	03:00-04:00	60.3	53.2	55.2	57.5	62.5	63.5
7	04:00-05:00	65.5	52.7	63.8	53.6	68.4	59.6
8	05:00-06:00	61.0	65.4	64.7	61.1	64.1	65.9
Night Time Limit*		70 dB(A) Leq					

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POLLUCON LABORATORIES PVT. LTD. SURAT-7.

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Minimum Detection Limit [MDL]

Water parameter(mg/L)		
Sr. No.	**Test parameter**	**MDL**
1	pH	2
2	Temperature	2
3	Colour	2
4	Total Suspended Solids	2
5	Oil & Grease	2
6	Ammonical Nitrogen as NH_3	0.2
7	BOD (3 Days @ 27 ^oC)	1
8	COD	5
9	Chloride as Cl	1
10	Total Dissolved Solids	10

Ambient Air Parameters		
Sr. No.	**Test Parameter**	**MDL**
1	Particulate Matter (PM10) ($\mu g/m^3$)	10
2	Particulate Matter (PM 2.5) ($\mu g/m^3$)	10
3	Sulphur Dioxide (SO_2) ($\mu g/m^3$)	5
4	Oxides of Nitrogen ($\mu g/m^3$)	5
5	Hydrogen Sulphide as H_2S ($\mu g/m^3$)	6

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7.

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Monthly Average Report
Ambient Air Quality Monitoring

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : April - 2021

Name of Location : Village - Siracha

ID No. : **URA/ID/A-21/04/001**

Sr. No.	Sampling Date	Concentration In Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	N.A.
1.	02/04/2021	65.2	28.3	16.6	23.4		-
2.	05/04/2021	70.5	32.2	14.6	21.5		--
3.	09/04/2021	77.5	34.0	19.4	25.5	14.8	BDL
4.	12/04/2021	57.4	23.9	14.1	23.3		--
5.	16/04/2021	70.9	33.3	15.4	22.6		--
6.	19/04/2021	76.5	23.1	19.0	25.7		--
7.	23/04/2021	57.3	27.5	18.3	21.3		--
8.	26/04/2021	60.7	21.2	16.6	19.5		--
9.	30/04/2021	70.8	31.1	12.4	21.5		
Average		**67.4**	**28.3**	**16.3**	**22.7**		--

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, PM_{10} - IS: 5182 (Part 23), 2006, $PM_{2.5}$- Guidelines by CPCB (Vol-1), SO_2 - IS: 5182 (Part 2), 2001, NO_x - IS: 5182 (Part 6), 2006, **Hg:** AAS by VGA Method -3112 B APHA 22 Edison & Hg: 2 ppb**O3:** IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

Ambient Air Quality Monitoring

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : April - 2021

Name of Location : Village - Kandagara

ID No. : **URA/ID/A-21/04/002**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	02/04/2021	74.1	29.7	14.2	22.5		–
2.	05/04/2021	67.2	23.4	21.6	27.3		--
3.	09/04/2021	59.3	21.5	18.2	21.7	19.2	BDL
4.	12/04/2021	74.5	22.8	15.0	26.7		--
5.	16/04/2021	76.7	34.9	12.9	21.0		--
6.	19/04/2021	52.7	23.0	16.5	22.6		--
7.	23/04/2021	60.3	28.5	13.4	17.2		--
8.	26/04/2021	57.0	21.5	15.6	23.7		--
9.	30/04/2021	68.0	31.0	13.2	18.6		
Average		**65.5**	**26.3**	**15.6**	**22.4**		–

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM– IS: 5182 (Part 4), 1999, **PM_{10}**– IS: 5182 (Part 23), 2006, **$PM_{2.5}$** Guidelines by CPCB (Vol-1), **SO_2**– IS: 5182 (Part 2), 2001, **NO_X**– IS: 5182 (Part 6), 2006, **Hg:** AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3:** IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

Ambient Air Quality Monitoring

Name and Address of Client	:	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.
Month of Monitoring	:	April - 2021
Name of Location	:	Village - Wandh
ID No.	:	**URA/ID/A-21/04/003**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	02/04/2021	74.1	30.6	15.5	21.5		--
2.	05/04/2021	69.8	31.0	21.1	25.2		–
3.	09/04/2021	59.7	26.4	17.3	22.2	22.1	BDL
4.	12/04/2021	75.6	31.9	19.4	31.7		--
5.	16/04/2021	83.7	38.7	23.0	28.8		--
6.	19/04/2021	71.6	32.5	18.6	21.4		--
7.	23/04/2021	67.9	25.7	25.5	29.7		--
8.	26/04/2021	63.8	27.4	20.5	27.1		--
9.	30/04/2021	69.3	30.1	17.3	22.4		
Average		**70.6**	**30.5**	**19.8**	**25.6**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg:** AAS by VGA Method -3112 B APHA 22 Edison & Hg: 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

Ambient Air Quality Monitoring

Name and Address of Client	:	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.
Month of Monitoring	:	May - 2021
Name of Location	:	Village - Siracha
ID No.	:	**URA/ID/A-21/05/001**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	**$PM_{2.5}$ µg/M³**	**Sulphur Dioxide (SO_2) µg/M³**	**Nitrogen Dioxide (NO_2) µg/M³**	**Ozone (O_3) µg/M³**	**Mercury (Hg) µg/M³**
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	03/05/2021	63.4	27.0	15.7	19.6		–
2.	07/05/2021	73.1	30.2	20.4	25.5		–
3.	10/05/2021	72.7	27.1	18.4	23.0		–
4.	13/05/2021	68.0	22.0	17.1	21.4		–
5.	21/05/2021	71.7	32.0	13.8	17.3		–
6.	25/05/2021	58.0	22.9	15.3	19.1	16.2	BDL
7.	28/05/2021	68.3	26.5	19.5	24.4		--
Average		**67.9**	**26.8**	**17.2**	**21.5**		–

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_X** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg: 2** ppb**O3**: **IS** – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

Ambient Air Quality Monitoring

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch,
GUJARAT – 370 435.

Month of Monitoring : May - 2021

Name of Location : Village - Kandagara

ID No. : **URA/ID/A-21/05/002**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	03/05/2021	68.1	28.4	21.5	26.6		--
2.	07/05/2021	62.6	22.1	17.0	22.3		--
3.	10/05/2021	63.8	20.5	14.3	17.7		--
4.	13/05/2021	55.4	22.2	23.1	28.6		--
5.	21/05/2021	70.2	32.4	15.4	18.2		--
6.	25/05/2021	63.5	23.2	17.2	20.4	20.7	BDL
7.	28/05/2021	65.6	26.8	14.8	18.5		--
Average		**64.2**	**25.1**	**17.6**	**21.8**		**--**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM– IS: 5182 (Part 4), 1999, **PM_{10}**– IS: 5182 (Part 23), 2006, $PM_{2.5}$– Guidelines by CPCB (Vol-1), **SO_2**– IS: 5182 (Part 2), 2001, **NO_x**– IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & Hg: 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report
Ambient Air Quality Monitoring

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : May - 2021

Name of Location : Village - Wandh

ID No. : **UERL/ID/A-21/05/009**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	03/05/2021	70.7	34.9	16.3	20.3		--
2.	07/05/2021	59.9	30.2	22.1	27.1		--
3.	10/05/2021	66.0	25.6	24.4	29.5		--
4.	13/05/2021	79.3	30.4	18.6	22.2		--
5.	21/05/2021	74.9	32.1	16.7	19.5		--
6.	25/05/2021	85.9	35.7	18.2	25.7	24.3	BDL
7.	28/05/2021	68.6	31.7	20.6	24.6		--
Average		**72.2**	**31.5**	**19.6**	**24.1**		**--**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** IS: 5182 (Part 6), 2006, **Hg:** AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3:** IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

Ambient Air Quality Monitoring

Name and Address of Client	:	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.
Month of Monitoring	:	June - 2021
Name of Location	:	Village - Siracha
ID No.	:	**URA/ID/A-21/06/001**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	04/06/2021	67.2	25.5	17.8	21.4		--
2.	08/06/2021	69.1	29.8	15.5	22.3		--
3.	11/06/2021	71.9	26.9	20.5	24.8	13.2	BDL
4.	15/06/2021	62.0	22.2	19.2	23.2		–
5.	18/06/2021	Rain Fall					
6.	22/06/2021	61.0	29.2	17.4	20.9		–
7.	25/06/2021	54.8	17.3	21.6	26.2		–
8.	29/06/2021	50.9	21.0	21.6	26.2		–
Average		**62.4**	**24.6**	**19.1**	**23.6**		..

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg**: 2 ppb**O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

Ambient Air Quality Monitoring

Name and Address of Client	:	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.
Month of Monitoring	:	June - 2021
Name of Location	:	Village Kandagara
ID No.	:	**UEA/ID/A-21/06/002**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	04/06/2021	69.7	25.6	20.7	21.8		--
2.	08/06/2021	53.1	21.7	19.8	17.9		--
3.	11/06/2021	61.3	23.2	15.3	19.4	17.2	BDL
4.	15/06/2021	77.3	32.6	20.7	28.8		--
5.	18/06/2021	Rain Fall					
6.	22/06/2021	60.2	24.4	17.5	21.6		--
7.	25/06/2021	65.2	18.7	16.8	19.9		--
8.	29/06/2021	63.5	22.7	16.8	23.9		--
Average		**64.3**	**24.1**	**18.2**	**21.9**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM– IS: 5182 (Part 4), 1999, **PM_{10}**– IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2**– IS: 5182 (Part 2), 2001, **NO_X**– IS: 5182 (Part 6), 2006, **Hg:** AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

Ambient Air Quality Monitoring

Name and Address of Client	:	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.
Month of Monitoring	:	June - 2021
Name of Location	:	Village - Wandh
ID No.	:	**URA/ID/A-21/06/003**

Sr. No.	Sampling Date	Concentration In Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	04/06/2021	78.0	36.0	21.3	22.1		--
2.	08/06/2021	83.6	42.1	20.6	23.9		--
3.	11/06/2021	79.5	37.7	22.9	25.3	21.4	BDL
4.	15/06/2021	70.6	33.3	17.1	24.0		--
5.	18/06/2021	Rain Fall					
6.	22/06/2021	61.3	31.8	17.7	23.5		--
7.	25/06/2021	60.9	29.8	19.1	26.4		--
8.	29/06/2021	63.3	33.6	21.5	25.3		--
Average		**71.0**	**34.9**	**20.0**	**24.4**		**--**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, $PM_{2.5}$- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_X** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: **IS** – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

Ambient Air Quality Monitoring

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : July - 2021

Name of Location : Village - Siracha

ID No. : **URA/ID/A-21/07/001**

Sr. No.	Sampling Date	Concentration In Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	02/07/2021	61.6	26.6	17.3	22.7		--
2.	06/07/2021	42.8	15.9	10.6	19.5		--
3.	09/07/2021	51.3	19.3	13.1	16.3	11.6	BDL
4.	13/07/2021	Rain Fall					--
5.	16/07/2021						--
6.	20/07/2021						--
7.	23/07/2021						--
8.	27/07/2021						--
9.	30/07/2021						
Average		**51.9**	**20.6**	**13.7**	**19.5**		--

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, $PM_{2.5}$- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, Hg: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppbO3: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

Ambient Air Quality Monitoring

Name and Address of Client	:	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.
Month of Monitoring	:	July - 2021
Name of Location	:	Village Kandagara
ID No.	:	**URA/ID/A-21/07/002**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	02/07/2021	44.2	15.6	11.8	17.4		--
2.	06/07/2021	63.2	21.7	18.0	21.9		--
3.	09/07/2021	59.5	23.2	15.3	18.5	15.8	BDL
4.	13/07/2021	Rain Fall					--
5.	16/07/2021						--
6.	20/07/2021						--
7.	23/07/2021						--
8.	27/07/2021						--
9.	30/07/2021						--
Average		**55.6**	**20.2**	**15.0**	**19.3**		**--**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM– IS: 5182 (Part 4), 1999, **PM_{10}**– IS: 5182 (Part 23), 2006, **$PM_{2.5}$**– Guidelines by CPCB (Vol-1), **SO_2**– IS: 5182 (Part 2), 2001, **NO_X**– IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg**: 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report
Ambient Air Quality Monitoring

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : July - 2021

Name of Location : Village - Wandh

ID No. : **URA/ID/A-21/07/003**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	60	80	80	100	N.A.
1.	02/07/2021	61.1	26.0	16.5	17.6		--
2.	06/07/2021	53.8	22.1	13.6	20.8		--
3.	09/07/2021	70.6	30.7	18.2	24.0	18.3	BDL
4.	13/07/2021	Rain Fall					--
5.	16/07/2021						--
6.	20/07/2021						--
7.	23/07/2021						--
8.	27/07/2021						--
9.	30/07/2021						
Average		**61.8**	**26.3**	16.1	**20.8**		–

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM IS: 5182 (Part 4), 1999, PM_{10} IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_X** - IS: 5182 (Part 6), 2006, Hg: AAS by VGA Method 3112 B APHA 22 Edison & **Hg:** 2 ppb **O3:** IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

Ambient Air Quality Monitoring

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : August - 2021

Name of Location : Village - Siracha

ID No. : **URA/ID/A-21/08/001**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	03/08/2021	52.9	17.4	14.2	16.7		-
2.	06/08/2021	56.9	20.7	12.0	15.2		--
3.	10/08/2021	50.5	22.2	17.2	21.5		--
4.	13/08/2021	52.4	22.5	15.0	18.9		--
5.	17/08/2021	57.4	25.9	12.7	16.4		--
6.	20/08/2021	61.1	23.2	10.5	13.9	13.7	BDL
7.	24/08/2021	70.7	21.6	15.7	17.2		--
8.	27/08/2021	63.2	20.5	13.8	19.4		--
Average		**58.1**	**21.8**	**13.9**	**17.4**		--

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, $PM_{2.5}$- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg:** AAS by VGA Method -3112 B APHA 22 Edison & **Hg: 2 ppbO3:** IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

Ambient Air Quality Monitoring

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : August - 2021

Name of Location : Village - Kandagara

ID No. : **URA/ID/A-21/08/002**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	03/08/2021	54.9	17.1	16.5	20.2		--
2.	06/08/2021	60.1	23.9	11.2	14.6		--
3.	10/08/2021	55.1	19.2	14.8	18.5		--
4.	13/08/2021	56.4	22.3	12.7	15.3		--
5.	17/08/2021	52.7	24.4	17.6	20.8		--
6.	20/08/2021	60.5	23.3	13.5	16.9	17.4	BDL
7.	24/08/2021	64.8	21.0	10.2	13.5		--
8.	27/08/2021	72.2	28.3	12.7	20.3		--
Average		**59.6**	**22.4**	**13.7**	**17.5**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM– IS: 5182 (Part 4), 1999, **PM_{10}**– IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-I), **SO_2**– IS: 5182 (Part 2), 2001, **NO_x**– IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3:** IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

Ambient Air Quality Monitoring

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : August - 2021

Name of Location : Village - Wandh

ID No. : **URA/ID/A-21/08/003**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	03/08/2021	55.3	29.7	19.3	18.5		--
2.	06/08/2021	64.9	31.4	21.2	24.6		--
3.	10/08/2021	68.5	28.7	20.4	23.1		--
4.	13/08/2021	59.8	32.8	13.0	15.7		--
5.	17/08/2021	60.7	34.3	14.9	20.6		--
6.	20/08/2021	68.5	31.1	16.7	22.2	20.2	BDL
7.	24/08/2021	72.2	28.6	17.6	19.8		--
8.	27/08/2021	63.4	20.6	15.2	22.3		--
Average		**64.2**	**29.6**	**17.3**	**20.9**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_X** - IS: 5182 (Part 6), 2006, **Hg:** AAS by VGA Method 3112 B APHA 22 Edison & **Hg:** 2 ppb **O3:** IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

Ambient Air Quality Monitoring

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : September - 2021

Name of Location : Village - Siracha

ID No. : **URA/ID/A-21/09/001**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	01/09/2021	Rainfall					--
2.	05/09/2021						--
3.	18/09/2021						--
4.	12/09/2021						–
5.	15/09/2021						–
6.	17/09/2021	53.6	22.2	10.2	13.4	14.5	BDL
7.	21/09/2021	49.2	18.7	13.7	17.2		–
8.	26/09/2021	Rainfall					–
9.	29/09/2021						–
Average		**51.4**	**20.5**	**12.0**	**15.3**		–

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb**O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report
Ambient Air Quality Monitoring

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : September - 2021

Name of Location : Village - Kandagara

ID No. : **URA/ID/A-21/09/002**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	01/09/2021	Rainfall					--
2.	05/09/2021						--
3.	18/09/2021						--
4.	12/09/2021						--
5.	15/09/2021						--
6.	17/09/2021	58.0	23.6	12.8	15.3	16.4	BDL
7.	21/09/2021	43.7	19.9	10.2	13.5		--
8.	26/09/2021	Rainfall					--
9.	29/09/2021						--
Average		50.8	21.8	11.5	14.4		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM– IS: 5182 (Part 4), 1999, **PM_{10}**– IS: 5182 (Part 23), 2006, **$PM_{2.5}$** Guidelines by CPCB (Vol-1), **SO_2**– IS: 5182 (Part 2), 2001, **NO_x**– IS: 5182 (Part 6), 2006, **Hg:** AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

UniStar Environment &
Research Labs Pvt. Ltd.

(Authorized Signatory)

Monthly Average Report

Ambient Air Quality Monitoring

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : September - 2021

Name of Location : Village Wandh

ID No. : **URA/ID/A-21/09/003**

Sr. No.	Sampling Date	Concentration in Ambient Air (μg /m³)					
		PM_{10} μg/M³	$PM_{2.5}$ μg/M³	Sulphur Dioxide (SO_2) μg/M³	Nitrogen Dioxide (NO_2) μg/M³	Ozone (O_3) μg/M³	Mercury (Hg) μg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	01/09/2021						–
2.	05/09/2021						–
3.	08/09/2021			Rainfall			–
4.	12/09/2021						–
5.	15/09/2021						–
6.	17/09/2021	66.4	30.8	15.3	20.7	19.7	BDL
7.	21/09/2021	51.8	21.6	14.6	16.8		--
8.	26/09/2021			Rainfall			--
9.	29/09/2021						--
Average		59.1	26.2	15.0	18.8		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, PM_{10} - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, Hg: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 μg/m3

UniStar Environment &
Research Labs Pvt. Ltd.

(Authorized Signatory)

UniStar
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MoEF&CC (GOI) Recognized Environmental Laboratory under EPA [illegible] | QCI-NABET Accredited EIA Consultant Organization | GPCB Recognized Environmental Auditor (Schedule - II) | ISO 9001 : 2015 Certified Company | ISO 45001 : 2018 Certified Company

TEST REPORT
(AMBIENT AIR MONITORING)

Test Report No.:	**URA/21/09/A-AP001**	**Report Issue Date**	30/09/2021
Sample ID No.:	URA/ID/A-21/09/001		
Name & Add. of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.		
Dates of Sampling:	17/09/2021	Date of Testing	20/09/2021
Sampling Procedure:	CPCB Guideline		
Location of Sampling / Monitoring:	**Village - Siracha**		

➢ **Details of Master Instrument Used for Monitoring**

Instrument Id No.	Instrument Name	Serial Number	Cali. Date	Next Cali. Date
UERL/AIR/RDS/24	Respirable Dust Sampler	2345-DTB-2012 1039-DTC-2012	02/08/2021	01/08/2022
UERL/AIR/FPS/30	Fine Particulate Sampler	132-DTL-2012	02/08/2021	01/08/2022

➢ **General Sampling / Monitoring Observation as per CPCB Guideline**

Sr. No.	Description	Unit of measurement	Observation
1.	Monitoring Duration	h	24
2.	Flow Rate of PM_{10}	m^3/min	1.22
3.	Volume of Air Sampled for PM_{10}	m^3	1756
4.	Volume of Air Sampled for $PM_{2.5}$	m^3	24.04
5.	Flow Rate for Gas	L/min	0.2
6.	Volume of Air Sample for Gas	L	288

➢ **Environmental Conditions during testing:** Temp.: 25 ± 5 °C, Relative Humidity: 40 to 50%

➢ **Test Parameter Results**

Sr. No.	Test Parameter	Unit	Result	Permissible Limit [As per NAAQMS]	Test Method
1.	Particulate Matter. (PM_{10})	µg/m^3	53.6	**100**	IS – 5182, Part - 23
2.	Particulate Matter. ($PM_{2.5}$)	µg/m^3	22.2	**60**	UERL/AIR/SOP/11
3.	Sulphur Dioxide	µg/m^3	10.7	**80**	IS – 5182, Part – 2
4.	Nitrogen Dioxide	µg/m^3	13.4	**80**	IS – 5182, Part - 6
5.	Carbon Monoxide	mg/m^3	1.03	**4.0**	IS – 5182, Part – 10
6.	Ozone	µg/M^3	14.5	**180**	IS – 5182, Part – 9
7.	Ammonia	µg/m^3	<20	**400**	UERL/AIR/SOP/05
8.	Lead	µg/m^3	<0.50	**1.0**	IS – 5182, Part – 22
9.	Nickel	ng/m^3	<1.0	**20**	IS – 5182, Part – 22
10.	Arsenic	ng/m^3	<1.0	**6.0**	IS – 5182, Part – 22
11.	Benzene	µg/m^3	<1.0	**5.0**	IS – 5182, Part – 11
12.	Benzo pyrene	ng/m^3	<0.1	**1.0**	IS – 5182, Part – 12

Note: **NAAQMS:** National Ambient Air Quality Monitoring Standard.
BDL: Below Detection Limit:1) Hg: 0.001 µg/M^3, 2) Ozone: 5.0 µg/M^3

Remarks:
Opinion & Interpretation (if required):

****** End of Report ******

Checked By:

Nikunj D. Patel
(Chemist)
Page No.: 1 of 1

Authorized By:

Jaivik S. Tandel
(Manager - Operations)
UERL/AIR/F-05/05

Note: This report is subject to Terms and Conditions mentioned overleaf.

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TEST REPORT
(AMBIENT AIR MONITORING)

Test Report No.:	**URA/21/09/A-AP002**	**Report Issue Date**	30/09/2021
Sample ID No.:	URA/ID/A-21/09/002		
Name & Add. of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch, GUJARAT – 370 435.		
Dates of Sampling:	17/09/2021	Date of Testing	20/09/2021
Sampling Procedure:	CPCB Guideline		
Location of Sampling / Monitoring:	**Village - Kandagara**		

➢ **Details of Master Instrument Used for Monitoring**

Instrument Id No.	Instrument Name	Serial Number	Cali. Date	Next Cali. Date
UERL/AIR/RDS/25	Respirable Dust Sampler	1744-DTA-2013 1127-DTJ-2012	02/08/2021	01/08/2022
UERL/AIR/FPS/41	Fine Particulate Sampler	137-DTD-2013	03/08/2021	02/08/2022

➢ **General Sampling / Monitoring Observation as per CPCB Guideline**

Sr. No.	Description	Unit of measurement	Observation
1.	Monitoring Duration	h	24
2.	Flow Rate of PM_{10}	m^3/min	1.24
3.	Volume of Air Sampled for PM_{10}	m^3	1786
4.	Volume of Air Sampled for $PM_{2.5}$	m^3	24.04
5.	Flow Rate for Gas	L/min	0.2
6.	Volume of Air Sample for Gas	L	288

➢ **Environmental Conditions during testing:** Temp.: 25 ± 5 °C, Relative Humidity: 40 to 50%

➢ **Test Parameter Results**

Sr. No.	Test Parameter	Unit	Result	Permissible Limit (As per NAAQMS)	Test Method
1.	Particulate Matter. (PM_{10})	$\mu g/m^3$	58.0	**100**	IS – 5182, Part - 23
2.	Particulate Matter. ($PM_{2.5}$)	$\mu g/m^3$	23.6	**60**	UERL/AIR/SOP/11
3.	Sulphur Dioxide	$\mu g/m^3$	12.8	**80**	IS – 5182, Part – 2
4.	Nitrogen Dioxide	$\mu g/m^3$	15.3	**80**	IS – 5182, Part - 6
5.	Carbon Monoxide	mg/m^3	0.85	**4.0**	IS – 5182, Part – 10
6.	Ozone	$\mu g/M^3$	16.4	**180**	IS – 5182, Part – 9
7.	Ammonia	$\mu g/m^3$	<20	**400**	UERL/AIR/SOP/05
8.	Lead	$\mu g/m^3$	<0.50	**1.0**	IS – 5182, Part – 22
9.	Nickel	ng/m^3	<1.0	**20**	IS – 5182, Part – 22
10.	Arsenic	ng/m^3	<1.0	**6.0**	IS – 5182, Part – 22
11.	Benzene	$\mu g/m^3$	<1.0	**5.0**	IS – 5182, Part – 11
12.	Benzo pyrene	ng/m^3	<0.1	**1.0**	IS – 5182, Part – 12

Note: **NAAQMS:** National Ambient Air Quality Monitoring Standard.
BDL: Below Detection Limit:1) Hg: 0.001 $\mu g/M^3$, 2) Ozone: 5.0 $\mu g/M^3$

Remarks:
Opinion & Interpretation (If required):

****** **End of Report** ******

Checked By:

Nikunj D. Patel
(Chemist)
Page No.: 1 of 1

Authorized By:

Jaivik S. Tandel
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UERL/AIR/F-05/05

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TEST REPORT
(AMBIENT AIR MONITORING)

Test Report No.:	**URA/21/09/A-AP003**	**Report Issue Date**	30/09/2021
Sample ID No.:	URA/ID/A-21/09/003		
Name & Add. of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch, GUJARAT – 370 435.		
Dates of Sampling:	17/09/2021	Date of Testing	20/09/2021
Sampling Procedure:	CPCB Guideline		
Location of Sampling / Monitoring:	**Village - Wandh**		

➢ **Details of Master Instrument Used for Monitoring**

Instrument Id No.	Instrument Name	Serial Number	Cali. Date	Next Cali. Date
UERL/AIR/RDS/26	Respirable Dust Sampler	1745-DTA-2013, 1139 DTA-2013	02/08/2021	01/08/2022
UERL/AIR/FPS/42	Fine Particulate Sampler	125-DTD-2013	03/08/2021	02/08/2022

➢ **General Sampling / Monitoring Observation as per CPCB Guideline**

Sr. No.	Description	Unit of measurement	Observation
1.	Monitoring Duration	h	24
2.	Flow Rate of PM_{10}	m^3/min	1.26
3.	Volume of Air Sampled for PM_{10}	m^3	1814
4.	Volume of Air Sampled for $PM_{2.5}$	m^3	24.04
5.	Flow Rate for Gas	L/min	0.2
6.	Volume of Air Sample for Gas	L	288

➢ **Environmental Conditions during testing:** Temp.: 25 ± 5 °C, Relative Humidity: 40 to 50%

➢ **Test Parameter Results**

Sr. No.	Test Parameter	Unit	Result	Permissible Limit (As per NAAQMS)	Test Method
1.	Particulate Matter. (PM_{10})	µg/M^3	66.4	**100**	IS – 5182, Part - 23
2.	Particulate Matter. ($PM_{2.5}$)	µg/M^3	30.8	**60**	UERL/AIR/SOP/11
3.	Sulphur Dioxide	µg/M^3	15.3	**80**	IS – 5182, Part – 2
4.	Nitrogen Dioxide	µg/M^3	20.7	**80**	IS – 5182, Part – 6
5.	Carbon Monoxide	mg/m^3	1.10	**4.0**	IS – 5182, Part – 10
6.	Ozone	µg/M^3	19.7	**180**	IS – 5182, Part – 9
7.	Ammonia	µg/m^3	<20	**400**	UERL/AIR/SOP/05
8.	Lead	µg/m^3	<0.50	**1.0**	IS – 5182, Part – 22
9.	Nickel	ng/m^3	<1.0	**20**	IS – 5182, Part – 22
10.	Arsenic	ng/m^3	<1.0	**6.0**	IS – 5182, Part – 22
11.	Benzene	µg/m^3	<1.0	**5.0**	IS – 5182, Part – 11
12.	Benzo pyrene	ng/m^3	<0.1	**1.0**	IS – 5182, Part – 12

Note: NAAQMS: National Ambient Air Quality Monitoring Standard.
BDL: Below Detection Limit:1) Hg: 0.001 µg/M^3, 2) Ozone: 5.0 µg/M^3

Remarks:
Opinion & Interpretation (If required):

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Checked By:

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Page No.: 1 of 1

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Extended Work Office : G.I.D.C. Dahej-II, Bharuch, Gujarat.
CIN: [illegible]

adani

MARINE MONITORING REPORT

September– 2021(Monsoon)

FOR

M/s. ADANI POWER (MUNDRA) LIMITED

At

Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
KUTCH, GUJARAT – 370 435

Prepared by

UniStar
Environment & Research Labs Pvt. Ltd.

PREFACE

M/s. Adani Power (Mundra) Limited (APMuL) is a subsidiary company of Adani Group engaged in imported coal-based thermal power generation located near village Tunda and Siracha, Taluka Mundra District Kutch, Gujarat. APMuL has commissioned the first supercritical 660 MW unit in the country. This is also the World's First supercritical technology project to have received the 'Clean Development Mechanism (CDM) Project' certification from United Nations Framework Convention on Climate Change (UNFCCC). Currently, the total power production capacity of the APMuL has increased to 4620 MW.

APMuL has engaged **M/s. UniStar Environment and Research Labs Pvt. Ltd., Vapi** to **carry out the** seasonal Marine Monitoring Study along with the seawater intake and outfall (discharge) channels of Mundra power plant. This marine monitoring study involved the assessment of Physio-chemical parameters at the earlier prescribed locations. The distribution and diversity of marine flora and fauna were assessed through water sampling from sub-tidal regions. Furthermore, the distribution of the benthic community was evaluated from the sediment samples collected along the sub-tidal and inter-tidal regions. The overall objective of this study is to monitor the status of prevailing ecology along the intake and discharge (outfall) channels, in terms of water and sediment quality through assessment of physico-chemical parameters and marine biota. This marine monitoring report provides a comprehensive analysis of the Data obtained through a monitoring study undertaken during (Monsoon) September 2021.

Date: 21/09/2021

M/S.UniStar Environment and Research Labs Pvt. Ltd.
White House, Char Rasta,
Vapi-396 191

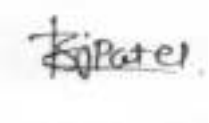
Sampling by	Report Prepared By	Approved by
		
(Bhavin Patel)	**(Shweta Rana)**	**(Jaivik Tandel)**

TABLE OF CONTENTS

1. INTRODUCTION

1.1 OVERVIEW

Adani Power (Mundra) Limited (APMuL) is an imported coal-based thermal power plant located near village Tunda and Siracha, Taluka Mundra, District Kutch, Gujarat, India. APMuL is the largest single location private coal-based power plant in the world. Mundra plant capacity is 4620 MW, comprising of 9 units with 4 units of 330 MW (Phase I and II) and 5 units of 660MW (Phase III and IV). The 330 MW units are based on subcritical technology and the 660 MW units are based on supercritical technology. APMuL has created history by synchronizing the first super-critical technology based 660MW generating unit. This is not only the first super-critical generating unit in the country but also the fastest project implementation ever by any power developer in the country. The Phase III of the Mundra project, which is based on supercritical technology, has received the 'Clean Development Mechanism (CDM) Project' certification from United Nations Framework Convention on Climate Change (UNFCCC).

M/S. UniStar Environment and Research Labs Pvt. Ltd., Vapi, India have carried out the routine Marine Monitoring Study in the vicinity of the APMuL Mundra plant. The sampling was carried out along the sea intake channel (2 stations) and discharge/outfall water mixing (3 stations) region. This assessment involves the collection of physico-chemical parameters from 5 subtidal locations (Table 1). The distribution and diversity of marine microflora (phytoplankton and pigments) and fauna (zooplankton) were assessed from water samples collected from 5 subtidal stations (Table 1). The assemblage of the microbenthic community was studied from 5 sub-tidal and 3 inter-tidal stations. This report presents the detailed results observed during the Marine Monitoring Study at the vicinity of the APMuL.

1.2 OBJECTIVES

a) To analyses the physico-chemical seawater parameter for understanding the water quality in the study area.

b) Estimation of the selected trace metals concentrations from sediment samples.

c) Evaluation of the prevailing status of marine biota through the quantitative and qualitative analysis of marine flora (phytoplankton and pigments) and fauna (zooplankton and macrobenthos).

d) To recommend adequate marine environmental management measures

2. STUDY PROGRAM

2.1 STUDY PERIOD

The field investigation was carried out on 21st and 22nd September 2021. The sampling strategy was planned in such a manner as to get a detailed characteristic of the marine environment of the study area. Sampling and analysis for the marine environment have been carried out by **M/S. UniStar Environment and Research Labs Pvt. Ltd, Vapi, India**.

2.2 SAMPLING LOCATIONS

Sampling was carried out at 5 subtidal stations and 3 intertidal transects along with the sea intake and outfall channels. Out of 5 subtidal stations, 2 were located in the sea intake channel and 3 along the discharge mixing (outfall channel) region. One intertidal station was located along the sea intake channel and 2 were along the discharge missing region. The detailed geographic coordinates of sampling stations are given in Table 1 and Figure 1.1.

Table 1: Geographic coordinates, water, and sediment parameters at the subtidal sampling stations, APMuL during September 2021.

Subtidal station							
Station	**Station code**	**Locations**	**Coordinates**		**Water depth**	**Tide**	**Sediment texture**
1	St-1	Intake point	22°48’31’69”N	69°32’57.18”E	6.5 m	Ebb	Silty sand
2	St-2	Mouth of intake point	22°46’54.62”N	69°32’02.89”E	7 m	Ebb	Sandy
3	St-3	West port area	22°45’16.56”N	69°34’45.26”E	9 m	Flood	Sandy
4	St-4	Outfall area	22°44’30.23”N	69°36’17.02”E	8.5 m	Flood	Silty sand
5	St-5	Outfall area	22°44’47.17”N	69°36’35.74”E	7 m	Flood	Loamy clay

Table 2: Geographic coordinates, water, and sediment parameters at the inertial sampling stations, APMuL during September 2021.

Intertidal transect						
Station	**Station code**	**Tide Level**	**Coordinates**	**Water depth**	**Intertidal exposed area**	**Sediment texture**
I	IT-1 (HW)	High Tidewater level	22°36'16.59" N	69°52'26.63" E	36 m	Sandy
	IT-1 (LW)	Low Tide water level	22°48'09.42"N	69°22'31.52"E		Silty-sand
II	IT-2 (HW)	High Tide water level	22°50'28.63" N	69°48'29.40" E	40 m	Sandy
	IT-2 (LW)	Low Tidewater level	22°38'40.48" N	69°36'42.13" E		Silty-sand
III	IT-3 (HW)	High Tidewater level	22°59' 12.30" N	69°39'32.52"E	41 m	Sandy
	IT-3 (LW)	Low Tidewater level	22°49' 21.46" N	69°45'19.31" E		Sandy

Figure 1: Map of the study area illustrating the subtidal and intertidal sampling stations.

2.3 SAMPLING STRATEGY

2.3.1 Sampling frequency

A sampling at the subtidal stations was carried out during the flood to ebb tides. Surface and bottom water samples were collected in duplicate for assessing water quality and marine biota. Intertidal samples were collected in duplicate during low tide at each transect.

2.3.2 Sampling methodology

For estimation of physico-chemical parameters and marine flora (phytoplankton and pigments), subsurface samples were collected using the Niskin water sampler (5-litre capacity) with a mechanism for closing at the desired depth. Surface water samples were collected using a clean polyethylene bucket. Phytoplankton samples were collected in clean polyethylene bottles (1 L) fitted with inert cap liners and preserved with 4% Lugol's iodine solution. For pigment analysis, water samples were stored in the clean, dark polyethylene cans (5 L). Chemical parameters samples were collected in polyethylene or glass bottles. Samples for phenol were collected in polyethylene or glass bottles and PHs collected in glass bottles. Dissolve oxygen (DO) samples were collected in glass BOD bottle and Biological Oxygen Demand (BOD) samples were collected in polyethylene or glass bottle. The temperature was measured on the field with a calibrated thermometer. Analysis of other parameters was carried out in the laboratory.

For zooplankton oblique hauls were made using Heron Tranter net attached with calibrated flow meter. Samples were stored in clean polyethylene bottles (0.5 L) and fixed with 5% formaldehyde.

For the analysis of macrobenthos, subtidal sediment samples were collected using a Van Veen grab covering an area of 0.04 m^2. Intertidal samples were collected using a metal quadrant. Samples were sieved with a 500 µ metal sieve and preserved with Rose Bengal-formalin solution and stored in plastic zip-lock bags.

2.4 SAMPLE ANALYSIS METHODS

2.4.1 Physico-chemical parameter:

Samples were analysed by using different analytical methods for estimations of Temperature, Turbidity, PH, SS, Salinity, DO, BOD, COD, Phosphate, Total nitrogen, Nitrite, Nitrate, Phenols and PHc. The standard methods used for the analysis of each parameter are given in Table 3.

2.4.2 Sediment Quality parameters:

Sediment texture, Petroleum Hydrocarbon (PHc), Phosphorus, Organic Carbon, Aluminium, Iron, Chromium, Nickel, Zinc, Lead, Copper, Cobalt, Cadmium, Mercury, Arsenic. The standard methods used for the analysis of each parameter are given in Table 3.

2.4.3 Biological parameters:

2.4.3a Phytoplankton:

The Lugol's preserved samples were allowed to settle for 48-72 hrs. The identification and enumeration of phytoplankton cells were carried out under a compound microscope using the Sedgwick Rafter slide. Species were identified to the genus level.

2.4.3b Phytoplankton pigments:

For the estimation of Chlorophyll *a* (Chl*a*) and Pheophytin, a known volume of field-collected water samples was filtered through Whatman glass microfiber filters (GF/F: 47 mm) and paper was macerated in 90% acetone and one night stored in the dark at 4ºC. For estimation of Chl*a* fluorescence of extract was measured using Turner Fluorometer. For phaeophytin fluorescence was measured after acidification with 0.1 N HCl (0.1 ml).

2.4.3c Zooplankton:

Formalin preserved sample was divided into 4 equal portions using the Folsom Plankton Splitter. One portion of samples was used to determine biomass using the volume displacement method. Another portion was used for enumeration and identification of (25-50 %) faunal composition.

For quantification of zooplankton, 4-5 ml of the sample was taken in a zooplankton counting chamber. The identification was carried out under Stereomicroscope. The zooplanktons were identified at the group level.

2.4.3d Benthos:

For enumeration and identification of the macrobenthos, the organisms were handpicked using forceps and a paintbrush. After sorting, organisms were preserved in 10% formalin. Identification of the organisms was done to the group level under a stereomicroscope.

3 WATER QUALITY MONITORING

3.1 RESULT OF PHYSICO-CHEMICAL WATER PARAMETER ANALYSIS

The samples collected during the field visit were brought to the laboratory for further analysis of physico-chemical parameters. The slandered methods used for the analysis of water quality parameters are given in Table 3

Table 3: Water quality parameters and their test methods.

Sr. No.	Parameters	Station 1		Station 2		Test Method Permissible
		Surface	Bottom	Surface	Bottom	
PHYSICAL QUALITY						
1.	pH @ 25 ° C	8.09	8.12	8.05	8.04	IS 3025(Part 11)1983
2.	Temperature (^{0}C)	28	27	28	27	IS 3025(Part 9)1984
3.	Turbidity (NTU)	1	0.1	1	1	IS 3025(Part 10)1984
CHEMICAL QUALITY						
1.	Total Suspended Solids (mg/l)	46	46	56	72	(APHA 23rd Ed.,2017,2540- D)
2.	Biochemical Oxygen Demand (BOD) (mg/l)	4.9	3.9	4.6	3.8	IS 3025(Part 44)1993Amd.01
3.	Sulphate as SO_4(mg/l)	3379	2971	2796	2606	(APHA 23rd Ed.,2017,4500- SO4 E)
4.	Ammonical Nitrogen(µmol/l)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	(APHA 23rd Ed.,2017,4500- NH3 B)
5.	Salinity	34.3	34.6	35.7	35.8	By Calculation
6.	Dissolved Oxygen (mg/l)	5.5	6.0	5.4	5.0	IS 3025(Part 38)1989,
7.	Total Nitrogen (µmol/l)	6.3	5.3	5.8	5.6	(APHA 23rd Ed.,2017,4500-O,B),
8.	PO_4^3-P (µmol/l)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	APHA 23rd Ed.,2017,4500 NH3 - B
9.	(NO_3-N)e (µmol/l)	0.5	0.6	0.5	0.4	(APHA 23rd Ed.,2017,4500-P,D)
10.	(NO_2-N) Nitrite (µmol/l)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	(APHA 23rd Ed.,2017,4500 NO3-B)
11.	Phenol(µmol/l)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	APHA 23rd Ed.,2017,4500NO2B
12.	PHc (ppb)	N.D.	N.D.	N.D.	N.D.	IS 3025(Part 43)1992Amd.02

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

Table 3 (Continued 2)

Sr. No	Parameters	Station 3		Station 4		Test Method Permissible
		Surface	Bottom	Surface	Bottom	
PHYSICAL QUALITY						
1.	pH @ 25 ° C	8.06	8.14	8.08	8.02	IS 3025(Part 11)1983
2.	Temperature ^{0}C	28	27	28	28	IS 3025(Part 9)1984
3.	Turbidity (NTU)	5	5	5	5	IS 3025(Part 10)1984
CHEMICAL QUALITY						
1.	Total Suspended Solids (mg/l)	104	110	128	156	(APHA 23rd Ed.,2017,2540- D)
2.	Biochemical Oxygen Demand (BOD) (mg/l)	3.9	2.8	4.1	3.8	IS 3025(Part 44)1993Amd.01
3.	Sulphate as SO_4(mg/l)	2821	2725	2322	2848	(APHA 23rd Ed.,2017,4500- SO4 E)
4.	Ammonical Nitrogen(µmol/l)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	(APHA 23rd Ed.,2017,4500- NH3 B)
5.	Salinity	35.0	35.7	34.3	35.3	By Calculation
6.	Dissolved Oxygen (mg/l)	5.6	5.3	5.4	5.5	IS 3025(Part 38)1989,
7.	Total Nitrogen (µmol/l)	5.3	5.1	4.9	4.6	(APHA 23rd Ed.,2017,4500-O,B),
8.	PO_4^3-P (µmol/l)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	0.18	APHA 23rd Ed.,2017,4500 NH3 - B
9.	(NO_3-N)e (µmol/l)	0.6	0.4	0.6	0.4	(APHA 23rd Ed.,2017,4500-P,D)
10.	(NO_2-N) Nitrite (µmol/l)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	(APHA 23rd Ed.,2017,4500 NO3-B)
11.	Phenol(µmol/l)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	APHA 23rd Ed.,2017,4500NO2B
12.	PHc (ppb)	N.D.	N.D.	N.D.	N.D.	IS 3025(Part 43)1992Amd.02

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

Table 3 (Continued 3)

Sr. No.	Parameters	Station 5		Test Method Permissible
		Surface	Bottom	
PHYSICAL QUALITY				
1.	pH @ 25 ° C	8.09	8.08	IS 3025(Part 11)1983
2.	Temperature (^{0}C)	29	28	IS 3025(Part 9)1984
3.	Turbidity (NTU)	5	5	IS 3025(Part 10)1984
CHEMICAL QUALITY				
1.	Total Suspended Solids	112	84	(APHA 23rd Ed.,2017,2540-D)
2.	Biochemical Oxygen Demand (BOD) (mg/l)	4.4	3.6	IS 3025(Part 44)1993Amd.01
3.	Sulphate as SO_4 (mg/l)	2249	3067	(APHA 23rd Ed.,2017,4500-SO4 E)
4.	Ammonical Nitrogen(µmol/l)	BDL(MDL:2.0)	BDL(MDL:2.0)	(APHA 23rd Ed.,2017,4500-NH3 B)
5.	Salinity	34.7	33.8	By Calculation
6.	Dissolved Oxygen (mg/l)	5.4	5.6	IS 3025(Part 38)1989,
7.	Total Nitrogen (µmol/l)	4.7	4.5	(APHA 23rd Ed.,2017,4500-O,B),
8.	PO_4^3-P (µmol/l)	BDL(MDL:0.1)	BDL(MDL:0.1)	APHA 23rd Ed.,2017,4500 NH3 - B
9.	(NO_3-N)e (µmol/l)	0.5	0.4	(APHA 23rd Ed.,2017,4500-P,D)
10.	(NO_2-N) Nitrite (µmol/l)	BDL(MDL:0.1)	BDL(MDL:0.1)	(APHA 23rd Ed.,2017,4500 NO3-B)
11.	Phenol(µmol/l)	BDL(MDL:0.01)	BDL(MDL:0.01)	APHA 23rd Ed.,2017,4500NO2B
12.	PHc(ppb)1M Level	N.D.	N.D.	IS 3025(Part 43)1992Amd.02

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

3.1.1 Temperature: Marine water temperature was checked on site during the sampling . Surface and bottom water temperatures observed in the study area were in a range between 27^{0}C to 28^{0}C. The water temperature generally varied in accordance with the prevailing air temperature, tidal activity, and seasonality.

3.1.2 pH: The pH of the water is generally buffering effect, influenced by the freshwater and anthropogenic discharge from land. The observed pH in the study area was in the range of 8.05 to 8.09 at the surface and 8.02 to 8.14 at bottom water.

3.1.3 Salinity: Salinity is an indicator of (saline or freshwater) water masses intrusion within the region. The standard average salinity of seawater is 33.8 to 35.7, which may vary with the riverine or inland influx, rains or evaporation in the region. The average salinity during the present monsoon sampling was 34.3 to 35.7 at surface and 33.8 to 35.7 at bottom water.

3.1.4 DO and BOD: High DO level is an indication of good oxidizing conditions in an aquatic environment. In unpolluted waters equilibrium is maintained through oxygen production during photosynthesis, dissolution from the atmosphere consumption by the respiration and decay of organic matter in a manner that DO levels are close to or above saturation value.

The DO level of the study area was varied from 5.4 to 5.6 mg/l at the water surface and 5 to 6 mg/l at bottom water. The average DO value during the monsoon season was 5.5 mg/l, which indicates the oxygenated conditions in the study region.

BOD is generally indicating effective consumption of oxidizable matter in that water body. The industrial effluents contain high BOD levels. Thus, high BOD is also an indication of the intrusion of industrial polluted effluent into natural waters. BOD levels in the study area were varied from 3.9 to 4.9 mg/l at surface and 2.8 to 4.6 mg/l at bottom water.

3.1.5 Nutrients: Dissolved phosphorus and nitrogen compounds serve as the nutrients for phytoplankton growth. The high nutrient concentrations in the seawater generally could be attributed to anthropogenic and industrial influx. This could lead to further eutrophication and further deterioration of the pristine ecosystem. Phosphorous compounds are present predominantly as reactive phosphate while combined nitrogen is present as nitrate, nitrite and ammonium species. In the present study, Phosphate concentration was below detection limits (BDL) at the surface and 0.18 µmol/l at bottom water. Nitrate concentration was range from 0.4 to 0.6 µmol/l on the surface and 0.4 to 0.6 µmol/l at bottom water. Nitrite concentration was below detection limits at the surface and bottom waters. These nutrient concentration values indicate water healthiness.

3.1.6 PHc and phenol: The Phenol compounds and PHc were not detected in the present investigation

.**3.1.7 Total suspended solids (TSS)**: The suspended solids generally constitute silt and clay eroded from the land or shore erosions and suspension of the benthic layers from the seabed. Anthropogenic discharges also contribute to suspended solids in the form of contaminants such as oil and solid waste in a polluted area. On a seasonal basis, high TSS in seawater could be observed during the active monsoon season. Suspended solid concentration in the study area was a little variable. In surface water, TSS was 46 to 128 mg/l and in the bottom water, it was range from 46 to 156 mg/l.

4 SEDIMENT QUALITY MONITORING

The sediment quality at different sampling stations was e measured during this investigation. The results are presented in Tables 4 and 5.

Table 4: Subtidal sediment quality parameters and their test methods.

No.	Parameters	SUBTIDAL SEDIMENT QUALITY(µgm/gm)					Test Method Permissible
		Station 1	Station 2	Station 3	Station 4	Station 5	
1	Texture	Silty sand	sandy	sandy	Silty sand	Loamy sand	--
2	Aluminium as Al%	N.D.	N.D.	N.D.	N.D.	N.D.	IS 3025(Part 55)2003
3	Cobalt as Co(µg/g)	7.8	9.9	8.0	8.1	8.6	AAS Method
4	Copper as Cu(µg/g)	10.3	8.3	9.9	8.9	11.2	IS 3025(Part 42)1992amd.01,
5	Zinc as Zn	30.3	32.3	30.9	30.6	31.7	IS 3025(Part 49)1994
6	Mercury(µg/g)	N.D.	N.D.	N.D.	N.D.	N.D.	(APHA 22nd Ed.,2012,3112-B)
7	Phosphorous (Total)(µg/g)	4.12	5.2	3.92	2.96	3.48	(APHA22nd Ed., 2012,4500-P,D)
8	C(Org.) %	0.8	0.9	1.0	0.8	1.2	Standard method (Walkley and Black, 1934).
9	Chromium(µg/g)	14.1	12.2	18.0	9.9	12.9	IS 3025(Part 52)2003,
10	Nickel(µg/g)	15.3	18.0	15.8	15.0	17.0	IS 3025(Part 54)2003,
11	Manganese	188.2	200.9	182.2	177.7	169.2	APHA22nd Ed.,2012,3500 Mn B
12	Iron%	1.3	2.4	3.2	2.8	2.1	IS 3025(Part 53)2003,
13	PHc(µg/g)	N.D.	N.D.	N.D.	N.D.	N.D.	G.C. Method
14	Arsenic(µg/g)	BDL(MDL :0.05)	BDL(MDL :0.05)	BDL(MDL :0.05)	BDL(MDL :0.05)	BDL(MDL:0.05)	APHA22nd Ed.2012,3114-C

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

Table 5: Intertidal sediment quality parameters and their test methods.

INTER TIDAL SEDIMENT QUALITY (µgm/gm)						
Sr. No	Parameters	Transect 1		Transect 2		Test Method Permissible
		High Tide	Low Tide	High Tide	Low Tide	
1.	Texture	Sandy	Sandy	Sandy	Sandy	--
2.	Aluminium as Al%	N.D.	N.D.	N.D.	N.D.	IS 3025(Part 55)2003
3.	Cobalt as Co(µg/g)	N.D.	N.D.	N.D.	N.D.	AAS Method
4.	Copper as Cu(µg/g)	BDL(MDL: 1.0)	BDL(MDL: 1.0)	BDL(MDL :1.0)	BDL(MDL:1.0)	IS 3025(Part 42)1992amd.01,

5.	Zinc as Zn	BDL(MDL: 1.0)	BDL(MDL: 1.0)	BDL(MDL :1.0)	BDL(MDL:1.0)	IS 3025(Part 49)1994
6.	Mercury(µg/g)	BDL(MDL: 0.05)	BDL(MDL: 0.05)	BDL(MDL :0.05)	BDL(MDL:0.0 5)	(APHA 22nd Ed.,2012,3112-B)
7.	Phosphorous (Total)(µg/g)	2.65	3.91	3.11	3.76	(APHA 22nd Ed.,2012,4500-P,D)
8.	C(Org.) %	0.4	0.6	0.5	0.8	Standard method (Walkley and Black, 1934).
9.	Chromium(µg /g)	BDL(MDL: 1.0)	BDL(MDL: 1.0)	BDL(MDL :1.0)	BDL(MDL:1.0)	IS 3025(Part 52)2003,
10.	Nickel(µg/g)	BDL(MDL: 1.0)	BDL(MDL: 1.0)	BDL(MDL :1.0)	BDL(MDL:1.0)	IS 3025(Part 54)2003,
11.	Manganese	6.25	8.24	4.90	6.11	APHA 22nd Ed.,2012,3500 Mn B
12.	Iron%	2.7	2.3	1.8	1.4	IS 3025(Part 53)2003,
13.	PHc(µg/g)	N.D.	N.D.	N.D.	N.D.	G.C. Method
14.	Arsenic(µg/g)	BDL(MDL: 0.05)	BDL(MDL: 0.05)	BDL(MDL :0.05)	BDL(MDL:0.0 5)	APHA 22nd Ed.,2012,3114-C

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

Table 5 Continued 2

Sr. No	Parameters	Transect 3		Test Method Permissible
		High Tide	Low Tide	
1.	Texture	Sandy	Sandy	--
2.	Aluminium as Al%	N.D.	N.D.	IS 3025(Part 55)2003
3.	Cobalt as Co(µg/g)	N.D.	N.D.	AAS Method
4.	Copper as Cu(µg/g)	BDL(MDL:1.0)	BDL(MDL:1.0)	IS 3025(Part42)1992amd.01,
5.	Zinc as Zn	BDL(MDL:1.0)	BDL(MDL:1.0)	IS 3025(Part 49)1994
6.	Mercury(µg/g)	BDL(MDL:0.05)	BDL(MDL:0.05)	(APHA 22nd Ed.,2012,3112-B)
7.	Phosphorous (Total)(µg/g)	2.93	3.60	(APHA 22nd Ed.,2012,4500-P,D)
8.	C(Org.) %	0.4	0.6	Standard method (Walkley and Black,1934).
9.	Chromium(µg/g)	BDL(MDL:1.0)	BDL(MDL:1.0)	IS 3025(Part 52)2003,
10.	Nickel(µg/g)	BDL(MDL:1.0)	BDL(MDL:1.0)	IS 3025(Part 54)2003,
11.	Manganese	5.25	6.05	APHA 22nd Ed.,2012,3500 Mn B
12.	Iron%	1.4	2.0	IS 3025(Part 53)2003,
13.	PHc(µg/g)	N.D.	N.D.	G.C. Method
14.	Arsenic(µg/g)	BDL(MDL:0.05)	BDL(MDL:0.05)	APHA 22nd Ed.,2012,3114-C

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

- The sediment in the subtidal region was mainly composed of silty sand to loamy sand. In the intertidal region, sediment **texture** was sandy.
- In the subtidal stations, the highest **phosphorus** content (5.2µgm/gm) was recorded at ST-2 whereas the lowest was at ST-4 (2.96 µgm/gm). In the intertidal region highest phosphorus content (3.91 µgm/gm) was recorded at IT-1(LWL) and lowest at (2.65 µgm/gm) IT-1(HWL)

- The **Chromium** content of marine sediment was ranged from 9.9 to 18 µgm/gm. The highest chromium content was recorded at ST-3 and the lowest at ST-4. In the Intertidal region, the chromium content was fount below the detection limit.
- The highest **Nickel** content (18.0 µgm/gm) was recorded at ST-2 and lowest (15.0µgm/gm) at ST-4. In the intertidal region nickel content was fount below the detection limit.
- At ST-5, the highest **Copper** content (11.2 µgm/gm) was recorded, whereas the lowest was detected at ST-2 (8.3 µgm/gm). In the intertidal region copper content was fount below the detection limit.
- The **Zinc** content (32.3 µgm/gm) was highest at ST-2 and the lowest zinc content (30.3 µgm/gm) at ST-1. The zinc content in the intertidal region was below the detection limit.
- The highest **Organic carbon** content (1.2 %) was recorded at ST-5 and the lowest (0.8%) at ST-4. In the intertidal region, the highest Organic carbon content (0.8%) was recorded at IT-2(LWL) and lowest (0.4%) at IT-1 (HWL).
- The **Iron** content was higher at ST-3 (3.2 %) and lower at ST-1 (1.3%). In the Intertidal region, the highest iron content was recorded at IT-1(HWL) (2.7%) and lowest at IT-1(LWL) (1.4%).
- In the subtidal region, the highest **Manganese** content was recorded at ST-2 (200.9µgm/gm), whereas the lowest was recorded at ST-5 (169.2µgm/gm). In the intertidal region highest Manganese content was recorded at IT-1(LWL) (8.24µgm/gm). The lowest Manganese content (4.90µgm/gm) was found at IT-2(HWL).
- The **Aluminium** was not detected.
- The highest **Cobalt** content (9.9µgm/gm) was recorded at ST-2 and lowest at ST-1 (7.8µgm/gm). In the intertidal region, Cobalt was not detected.
- The **PHc**, **Arsenic** & **Mercury** was not detected in the sediments during this study.

5 BIOLOGICAL PARAMETERS (BIODIVERSITY STUDY)

The Marine environment is unique ecosystem that involve the complex interaction between abiotic and biotic components. Any change in the abiotic factors leads to change in aquatic organisms (biotic factor). Human interventions always compromise the health of the marine ecosystem by disturbing the ecological balance. Hence the assessment of the biotic components along with abiotic factors is an integral part of environmental assessment and monitoring study. During the present study at APMuL, the abundance and distribution of marine organisms (plankton and benthos) were studied as part of routine environmental monitoring.

5.1 PLANKTONIC FORMS

The name plankton is derived from the Greek word “planktons”, meaning “wanderer” or “drifter”. While some forms of plankton are capable of independent movement and can swim up to several hundred meters in a single day, their position is primarily determined by currents in the body of water they inhabit. By definition, organisms classified as "plankton" are unable to resist ocean currents. Plankton is primarily divided into two broad functional groups i.e., Phytoplankton and Zooplankton.

5.1.1 Phytoplankton

The organisms responsible for primary production in all aquatic ecosystems are known as “phytoplankton.” These miraculous microscopic organisms not only form the base of life in our oceans but also produce up to 90% of the oxygen in our atmosphere.

Phytoplankton are microscopic plants that live in the ocean, freshwater, and other terrestrial-based water systems. There are many species of phytoplankton, each of which has a characteristic shape, size, and function. Marine species of phytoplankton grow abundantly in oceans around the world and are the foundation of the marine food chain. Marine phytoplankton are the producing (autotrophic) component in the ocean. There are fourteen classes of phytoplankton. Each class of phytoplankton contains unique attributes in size, cell structure, nutrients, and function.

5.1.2 Zooplankton:

Zooplankton are the consumer organisms, incapable of making their food from light or inorganic compounds, and feed on organisms or the remains of other organisms to get the energy necessary for survival. They are primarily depending on the phytoplankton and other small organisms’ groups for their nutritional needs.

5.2 SIGNIFICANCE OF PHYTO- AND ZOOPLANKTONS

Phytoplankton are the major primary producers of organic matter in the aquatic ecosystem. They contribute up to 90% in primary productivity in the Oceanic environment. As part of the photosynthesis process, they produce organic compounds from carbon dioxide with the help of sunlight and inorganic compound. Collectively, they directly or indirectly support the entire animal population and thus form the basis of most marine food webs. Phytoplankton also helps in the carbon dioxide sequestration process. The significance of zooplanktons is

found in their role in transferring biological production from phytoplankton to large organisms in the marine food web and the seafloor. The microscopic protozoan, tunicates, copepods and other crustaceans graze upon a large number of phytoplankton species. These in turn become food for other animals further linking the food web. Therefore, variability in reproduction of copepods would affect the survival of young fish that depend on them.

Table: 6 Test methods for phytoplankton and zooplankton analysis

Sr. no.	Test performed	Method
1	Phytoplankton	APHA, Edition 21, Part 10000, 10200 F
2	Chlorophyll *a* and Pheophytin	APHA, Edition 21, Part 10000, 10200 H (with some modification)
3	Zooplankton	APHA, Edition 21, Part 10000, 10200 G
4	Macro benthos	APHA, Edition 21, Part 10000,10500 A-10500 D

5.3 PHYTOPLANKTON DIVERSITY:

Phytoplankton sampling was carried out at 5 stations. At each station, water samples were collected from surface and bottom waters. The sampling location is given in the following table.7

During the sampling period (September 2021) the phytoplankton population in the coastal waters of APMuL, Mundra was diverse and represented with a total of 19 phytoplankton genera belonging to diatoms (17 genera) and dinoflagellates (2 genera) (Table 8). The diatoms species belonging to genus *Bacteriastrum*, *Chaetoceros*, *Corethron*, *Coscinodiscus*, *Cylindrotheca*, *Ditylum*, *Fragilaria*, *Gunardia*, *Hemialus*, *Leptocylindrus*, *Navicula*, *Odontella*, *Pleurosigma*, *Rhizosolenia*, *Skeletonema*, *Surirella*, *Thalassionema* and *Thalassiosira* dominated phytoplankton assemblage in the study region. Among them, species belonging to the genus *Thalassiosira* (48.7%) and *Fragilaria* (29.7%) were predominant. The maximum number of diatom species (12) were observed at station 2. Dinoflagellate population in the region was represented by only 2 species (*Alexandrium*, *Prorocentrum*) in very low abundance only at St-1 (bottom water).

The phytoplankton abundance in the study region was ranged from 64 to 1123 cells$\times10^{-2}$ L^{-1}. The highest phytoplankton abundance was observed at St-2 in surface (1123 cells$\times10^{-2}$ L^{-1}) and bottom (883 cells$\times10^{-2}$ L^{-1}) waters. The predominance of species belonging to the genus

Thalassionema (567 to 734 cells×10^{-2} L^{-1}) and *Fragilaria* (282 to 335cells×10^{-2} L^{-1}) was observed also at this station. The lowest phytoplankton abundance (61 cells×10^{-2} L^{-1}) was observed at St-4 in surface water (Table 7; Figure 2). The study shows that the marine water around APMuL, Mundra is nurturing and supporting the phytoplankton population.

Table 7: Phytoplankton abundance (cells×10^{-2} L^{-1}) at different sampling stations in the coastal waters of APMuL, Mundra during September 2021.

Note: S=surface; B=bottom; St=station

Phytoplankton genera	Sampling stations									
	St-1	St-1	St-2	St-2	St-3	St-3	St-4	St-4	St-5	St-5
	S	B	S	B	S	B	S	B	S	B
Diatoms										
Bacteriastrum	0	0	0	0	41.4	0	0	0	0	0
Chaetoceros	24.6	19.2	9	6	0	12	9	51	7.8	12
Corethron	0	0	0.6	0	0	0	0	0	1.2	0
Coscinodiscus	4.8	0	3.6	0.6	6	6.6	3	6.6	4.8	3
Cylindrotheca	0	1.8	0	1.8	0.6	0	0	1.8	0	0
Ditylum	13.2	4.2	6	3	9.6	15.6	6	6.6	15	13.2
Fragilaria	67.2	109	335	282	63	17.4	33	9	12	12
Gunardia	0	0	1.8	0	0	0	0	0	0	0
Hemialus	0	1.8	0	0	0	0	0	0	0	0
Leptocylindrus	0	0	0	0	5.4	0	0	0	0	0
Navicula	4.2	0.6	6.6	4.2	3.6	4.2	1.8	3	0.6	1.8
Odontella	0.6	0	6.6	6.6	4.2	5.4	1.8	3.6	15	1.8
Pleurosigma	0	0	0.6	1.8	0.6	0	0	0	0	1.2
Rhizosolenia	2.4	0	0.6	0.6	0	0.6	0	0.6	0	3
Skeletonema	4.2	10.8	0	0	0	0	0	0	1.2	0
Surirella	0	0	0	0.6	0	1.8	0	0	1.2	0
Thalassionema	12.6	6.6	18.6	8.4	6.6	12.6	4.2	10.8	15	136
Thalassiosira	1.8	196	734	567	11.4	4.8	4.8	4.8	6	9
Dinoflagellates										
Alexandrium	0	0.6	0	0	0	0	0	0	0	0
Prorocentrum	0	0.6	0	0	0	0	0	0	0	0
Total phytoplankton (cells×10^{-2} L^{-1})	**136**	**351**	**1123**	**883**	**152**	**81**	**64**	**98**	**80**	**193**

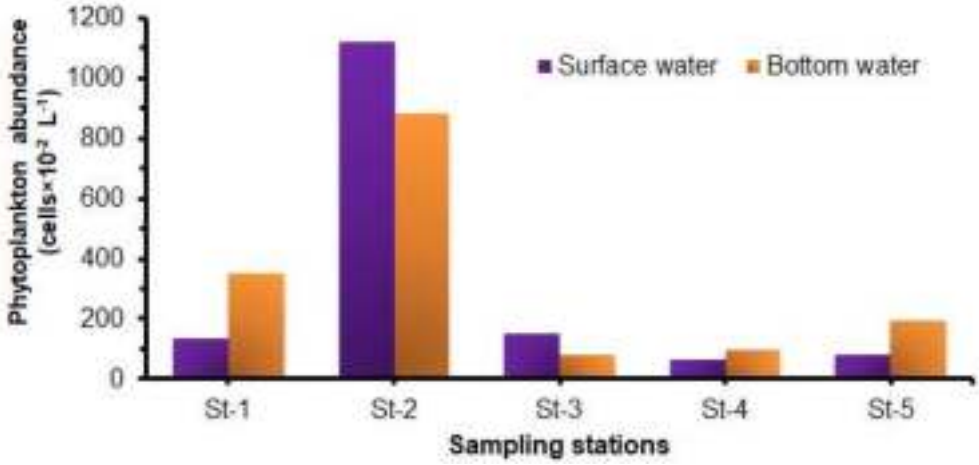


Figure 2: Phytoplankton abundance (cells×10^{-2} L^{-1}) reported in the surface and bottom waters along the APMuL coast, Mundra during September 2021.

***Coscinodiscus* sp.** ***Thalassiosira* sp.** ***Thalassionema* sp.**

Chaetoceros* sp.** ***Fragilaria* sp.** ***Odontella sp.

Figure 3: Microphotographs of phytoplankton reported in the coastal waters of APMuL, Mundra during September 2021.

5.4 PHYTOPLANKTON PIGMENTS (CHLOROPHYLL *a* AND PHEOPHYTIN):

Marine phytoplankton contains the essential as well as accessory pigment similar to that of terrestrial plants. Chlorophyll is the essential photosynthetic, green molecule responsible for energy fixation in the process of photosynthesis. The energy fixed by the phytoplankton gets transferred to higher tropic levels in the food web through the grazing process by the consumers. Chlorophyll is a measure of algal biomass and it acts as an empirical link between nutrient concentrations.

Algal chlorophyll forms a series of degradation products upon degradation. In addition to Chlorophyll the naturally occurring pigments in algal cells, a filtered water sample will also contain coloured degradation products of these pigments. The nature of these degradation products depends on which part of the chlorophyll molecule is affected. As chlorophyll degrades, the initial step is either the loss of the magnesium from the centre of the molecule or the loss of the phytol tail. This results in the formation of the molecule, *phaeophytin*. Depending on the parent molecule several distinct molecules like phaeophytins, chlorophyllides, and pheophorbides can be produced. Thus, in addition to Chlorophyll *a* filtered seawater contains colour degradation products of phytoplankton pigments.

5.4a CHLOROPHYLL *a* AND PHAEOPHYTIN CONCENTRATIONS

The phytoplankton biomass distribution expressed in terms of Chlorophyll a (Chl*a*) and phaeophytin at selected stations in the coastal region of APMuL, Mundra is presented in Table 8. The Chl*a* concentrations in the study region were ranged from 1.24 to 5.03 µg. L^{-1}. The phaeophytin content was ranged from 0.81 to 2.63 µg. L^{-1}. The Chl*a* and phaeophytin concentrations were more in the bottom water as compared to the surface water. The small variations observed between the surface and bottom waters could be due to the natural biological variability inherent to such dynamic ecosystems. The highest Chl*a* and phaeophytin concentrations were observed at St-2 both in surface and bottom waters (Table 8).

The concentration of phaeophytin is a measure of the dead cells and is an indirect indicator of biotic and abiotic stress conditions of the algae leading to a deterioration of Chl*a*. The ratio from concentrations of Chl*a* and phaeophytin in an aquatic ecosystem suggests a balance between the growth and mortality of phytoplankton life. In healthy environments, ratios of Chl*a* to phaeophytin generally exceed 1.2. In the present study, this ratio was ranged from 1.11 to 3.14 (Table 8). The Chl*a* and Phaeophytin ratio showed marginally elevated levels in the surface waters as compared to the bottom waters. Overall, the ratios of Chl*a* and phaeophytin

concentration in the study region were generally high (>1) except ST-1, indicating that the appropriate conditions prevailed for the phytoplankton growth.

Table 8: Chlorophyll *a*, Phaeophytin concentrations along with their ratios (Chl*a*: Phaeophytin) in the marine waters of APMuL, Mundra during September 2021.

Sampling stations		Chlorophyll a (µg. L^{-1})	Phaeophytin (µg. L^{-1})	Chl*a*: Phaeophytin ratio
St-1	Surface	2.31	1.99	1.16
	Bottom	2.88	1.53	1.88
St-2	Surface	4.85	1.55	3.14
	Bottom	5.03	2.63	1.91
St-3	Surface	2.65	0.96	2.77
	Bottom	1.50	1.22	1.23
St-4	Surface	1.24	1.06	1.17
	Bottom	1.34	0.81	1.66
St-5	Surface	2.01	1.80	1.11
	Bottom	2.52	1.78	1.41

5.5 ZOOPLANKTON DIVERSITY:

Zooplankton standing stock in terms of abundance and species composition revealed substantial spatial variation within all 5 stations (Table 9). The maximum zooplankton abundance (793 no. m^{-3}) and biomass (0.19 ml m^{-3}) were recorded at Station 1, whereas the lowest zooplankton abundance (553 no. m^{-3}) and biomass (0.11 ml m^{-3}) were observed at Station 4 (Figure 4).

A total of 11 groups of zooplankton including Copepods, Copepod nauplii, Oikopleura, Decapod larvae, Fish eggs and larvae, polychaete larvae, Gastropod larvae, Rotifera, Foraminifera and Mysids were identified during this study (Table 9). Among these groups Copepods (28 to 69 %) and Copepod nauplii (26 to 67%) were most dominant. Decapod larvae was another dominant group that contribute 2 to 35% to the zooplankton population in this region. Gastropod, polychaete larvae as well as fish eggs were another major group reported in the study area. The occurrence of copepods and their nauplii together with decapods and fish larvae/eggs in zooplankton samples highlights the fair production potential of live food resources (organisms) to support the fish and crustacean population in the study region.

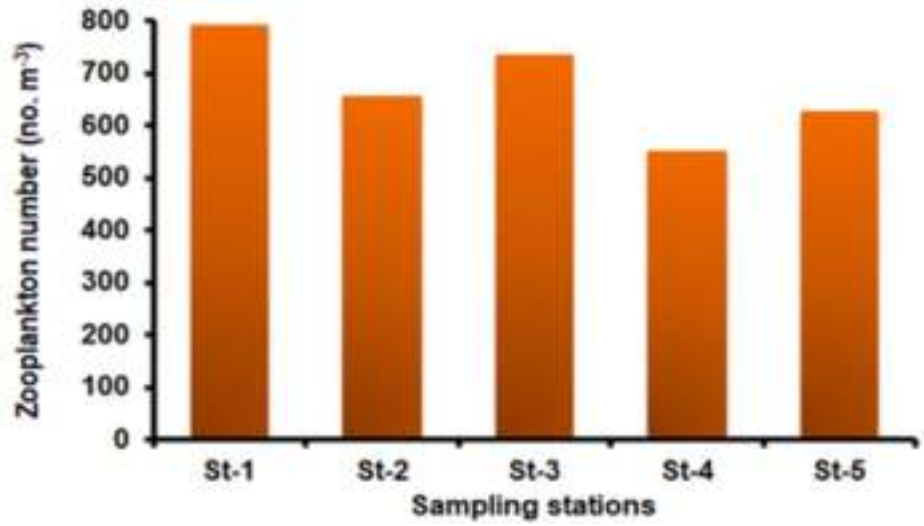


Figure 4: Zooplankton density (nos. / m^3) reported in the subtidal waters (Station 1 to 5) along the APMuL coast, Mundra during September 2021.

Table 9: Density (no. m^{-3}), percentage contribution (%) and biomass (ml. m^{-3}) of various zooplankton groups in the coastal waters at the APMuL, Mundra during September 2021.

Note: The values in the bracket indicates the percentage contribution of a particular group.

Zooplankton groups	Sampling stations				
	St-1	St-2	St-3	St-4	St-5
Copepods	419 (53)	236 (36)	478 (65)	152 (28)	432 (69)
Copepod nauplii	349 (44)	386 (59)	239 (32)	371 (67)	163 (26)
Oikopleura	6 (1)	0	2	0	3 (1)
Fish egg	1	5 (1)	0	7 (1)	6 (1)
Decapod larvae	4	21 (3)	11 (1)	19 (3)	16 (3)
Polychaete larvae	9 (1)	1	0	4 (1)	0
Gastropod larvae	5 (1)	8 (1)	7 (1)	0	6 (1)
Fish larvae	0	0	0	4 (1)	0
Rotifera	5 (1)	3 (1)	7 (1)	7 (1)	10 (2)
Foraminifera	0	1	9 (1)	0	0
Mysids	0	1	0	4 (1)	0
Total abundance (no m^{-3})	**793**	**656**	**736**	**553**	**627**
Biomass (ml. m^{-3})	**0.19**	**0.16**	**0.12**	**0.11**	**0.15**

Gastropod larvae

Copepod larvae

Rotifer

Polychaete larvae

Polychaete larvae

Copepod

Figure 5: Microphotographs of zooplanktons reported in the coastal waters of APMuL, Mundra during September 2021.

5.6 MACROBENTHIC FAUNA

The benthic zone is the ecological region at the lowest level of water (such as an ocean or a lake) which include the sediment surface and some sub-surface layers. The superficial layer of sediment is an integral part of the benthic zone, as it influences greatly the biological activity, which takes place there. Organisms living in this zone are called benthos. They generally live in a close relationship with the substrate bottom; many such organisms are attached to the bottom. Some benthic organisms are mainly dwelling at the bottom of the substratum but at times may travel upwards in the water column. They may also occupy rock crevices, organic debris, and another microhabitat at the bottom. The benthic invertebrates range from microscopic (e.g., micro invertebrates, <10 microns) to a few centimetres or more in length (e.g., macroinvertebrates).

Benthic organisms are morphologically different from that planktonic organisms. Many are adapted to live on the substrate (bottom). In benthic habitats, they can be considered dominant creatures. These organisms adapted to deep-water pressure so cannot survive in the upper parts

of the water column. Since light does not penetrate very deep ocean water, the benthic organisms often depend on the organic matter falling from the upper water column as their main energy source. This dead and decaying matter sustains the benthic food chain. The most benthic organisms are scavengers or detritivores. These organisms under being relatively stationary, are constantly exposed to changes undergoing in overlying water, and hence, respond very well to aquatic pollution. The macro benthos population is very sensitive to environmental perturbation and is highly influenced by the physicochemical characteristics of water, the nature of the substratum, food, predation, and other factors. The density of benthic invertebrates also fluctuates widely with the changes in the season.

5.6.1 Significance of macrobenthic organisms

The biomass of microbenthic organisms in estuaries and coastal embayment is often high. It declines if communities are affected by prolonged periods of poor water quality especially when anoxia and hypoxia are common. Burrowing and tube-building by deposit-feeding benthic organisms (bioturbations) help to mix the sediment and enhance the decomposition of organic matter. Nitrification and denitrification are also enhanced because a range of oxygenated and anoxic micro-habitats are created. For example, the area of oxic-anoxic boundaries and the surface area available for diffusive exchange are increased by tube-building macrobenthos.

The loss of benthic suspension-feeders can further enhance turbidity levels because these organisms filter suspended particles including planktonic algae, and they enhance sedimentation rates through bio deposition (*i.e.,* voiding of their wastes and unwanted food). Changes in the macro fauna (and flora) cause changes in nutrient storage pools. Macro fauna is also important constituents of fish diets and thus are an important link for transferring energy and nutrients between trophic levels, also driving pelagic fish and crustacean production. For these reasons, the benthic organisms are extremely important indicators of environmental change.

5.6.2 Benthic Diversity

5.6.2a Subtidal region:

The sediment texture at the sampling stations ranged from sandy-silty to silty sediment (Table 1 and 4), which directly affects the distribution of the benthic organisms in this region. The fluctuation in tidal level and exposer time also influences the occurrence of benthic organisms in the intertidal transects.

During the present study, high macrobenthos abundance and biomass was reported at subtidal stations than intertidal stations at APMuL, Mundra (Table 10). The macrobenthos density was ranged from 850 no. m^{-2} to 3225 no. m^{-2} at sampling stations (Table 10; Figure 6). Similarly, the biomass of the macrobenthic community in the study region was ranged from 0.57 g. m^{-2} to 1.66 g. m^{-2} in the study region. The maximum density and biomass of benthic macro-organisms were reported at Station 3 (3225 no. m^{-2} and 1.66 g. m^{-2} respectively). Similarly, the least maximum density (850 no. m^{-2}) and biomass (0.57 g. m^{-2}) were reported was observed at ST-1 (Table 10; Figure 6). In species composition, Polychaete species (Phylum Annelida) belonging to the family Paraonidae, Orbiniidae, Cossuridae, Spionidae, Nereidae, Capitellidae, Nephtyidae contributed (93.4%) to the total macrobenthic abundance in this region. More occurrence of this group could indicate the organic carbon enrichment in the sediment. Overall, the presence of Polychaete, Sipuncula worms and amphipods suggest the availability of food organisms for benthic predators in the area.

Table 10: Faunal composition, density (no. m^{-2}) and biomass (g. m^{-2}) of the macrobenthos community in the subtidal region at APMuL, Mundra during September 2021.

Faunal groups	Subtidal stations				
	St-1	St-2	St-3	St-4	St-5
Phylum Annelida					
Polychaeta	725	850	3125	1425	1300
Phylum Protozoa					
Foraminifera	25	0	25	0	0
Phylum Mollusca					
Bivalve	25	50	0	50	0
Phylum Arthropoda					
Amphipoda	50	50	75	50	50
Isopoda	0	0	0	0	0
Phylum Sipuncula					
Sipunculids	25	0	0	0	50
Total density (no. m^{-2})	**850**	**950**	**3225**	**1525**	**1400**
Biomass (g. m^{-2})	**0.57**	**0.76**	**1.66**	**0.90**	**0.80**

5.6.2b Intertidal region

The unstable sandy substratum with low organic matter affects the occurrence of the macrobenthic community in the intertidal region. Low macrobenthos biomass was measured (from 0.08 g. m^{-2} to 0.16 g. m^{-2}) in the intertidal region at the APMuL marine monitoring area (Table 11, Figure 6). The lowest density of macrobenthic organisms was reported at station IT-1 (HW) (50 no. m^{-2}), whereas, the highest density was reported at Station IT-1 (LW) (125 nos.

m^{-2}). Amphipoda species contributed (40%) to the total macrobenthic abundance at these stations followed by Polychaete (30%) (Table 11). No macrobenthic community was observed at ST-2 (HW) and ST-3 (HW and LW) may be due to unstable sandy sediment

Table 11: Faunal composition, density (nos. m^{-2}) of macrobenthos from the sediments collected at High Tide Levels (HTL) and Low Tide Levels (LTL) in the inter-tidal region at APMUL, Mundra during September 2021.

Note: LW=low water during low tide; HW=high water during high tide
Blank cells represent no organism count

Faunal groups	Intertidal stations					
	IT-1 (HW)	IT-1 (LW)	IT-2 (HW)	IT-2 (LW)	IT-3 (HW)	IT-3 (LW)
Phylum Annelida						
Polychaetae	0	50		25		
Phylum Mollusca	0	0		0		
Bivalve	0	25		0		
Phylum Arthropoda	0	0		0		
Amphipoda	25	50		25		
Isopoda	25	0		0		
Phylum Sipuncula	0	0		0		
Sipunculids	0	0		25		
Total density (no. m^{-2})	50	125		75		
Biomass (g. m^3)	0.08	0.16		0.09		

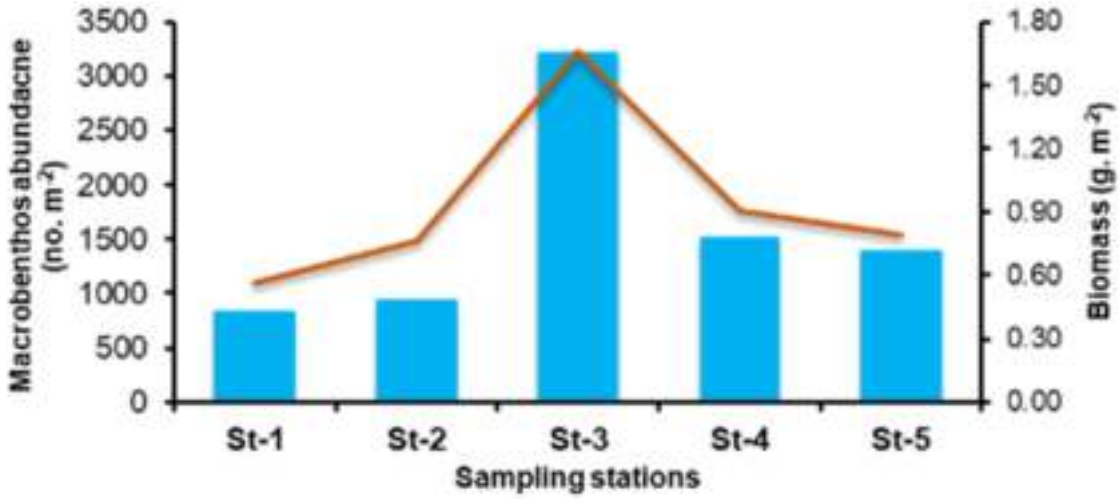


Figure 6: Subtidal macro benthos abundance (no. m^{-2}) at different sampling stations at APMuL, Mundra during September 2021

Amphipod

Polychaete (Family: Cossuridae)

Polychaete (Family: Spionidae)

Polychaete (Family: Nephtyidae)

Polychaete (Family: Nephtyidae)

Polychaete (Family: Capitellidae)

Figure 7: Microphotographs of microbenthic organisms observed in the sediment samples collected in the vicinity of APMuL, Mundra during September 2021.

6 CONCLUSION

Overall assessment reveals that the physicochemical and biological parameters of the present sampling data did not deviate from the baseline monitoring data. The diverse phytoplankton and zooplankton population indicates favourable water condition for their survival and growth. This diverse planktonic flora and together with enriched subtidal benthic fauna could substantially support the fishery population in the region. However, the unstable benthic sediment as the effect of natural (tidal currents, circulations) and anthropogenic activity (dredging, ship movement) activity could affect the settlement of the benthic fauna, especially in the west port and outfall area.

Table 12: Names of the Marine Monitoring Team Members

Sr. No.	Name of Person
1.	Dr. Dhiraj Narale (Marine Scientist)
2.	Mr. Vijay Thanki (Env. Chemist)
3.	Mr. Pravin Singh (Env. Chemist)
4.	Ms. Shweta A. Rana (Env. Microbiologist)
5.	Mr. Bhavin Patel (Env. Engineer)




DIFFERENT TYPES OF SAMPLING PHOTOGRAPHS

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Annexure – 5

ANALYSIS REPORT FOR
WATER / WASTE WATER SAMPLE

Sample ID:303038 - Analysis Completion:03/05/2021

Ports and harbour, jetties and dredging operations / LAB Inward : 6731

Gujarat Pollution Control Board, Kutch West
Katira Commercial Complex-1, First Floor
Near Income Tax office, Manglam Char rasta ,Sanskar nagar,
BHUJ - 370 001

TEST REPORT

Test Report No. : 6731 **Date: 03/05/2021**

1. Name of the Customer	:	**Adani Ports & Special Economic Zone Ltd. (WFDP-West Port) - 35427**
2. Address	:	**Navinal Island,,Mundra, Mundra-370421, Taluka : Mundra, District : Kutch East, GIDC : MPSEZ**
3. Nature of Sample	:	**REP-Representative/Grab, (Insp Type : APP-On Application)**
4. Sample Collected By	:	**MR. HARSH BAHECHARBHAI PATEL**
5. Quantity of Sample Received	:	**5.0 litres**
6. Code No. of the Sample	:	**303038**
7. Date & Time of Collection & Inwarding	:	**09/04/2021 , (1850 to 1851) & 15/04/2021**
8. Date of Start & Completion of Analysis	:	**15/04/2021 & 03/05/2021**
9. Sampling Point	:	**Final outlet of STP ~ Final Outlet of the STP**
10. Flow Details (Remarks)	:	
11. Mode of Disposal	:	**on land for gardening/plantation**
12. Ultimate Receiving Body	:	**No generation of industrial wastewater**
13. Temperature on Collection	:	**& pH Range on pH Strip :7 to 8 on pH strip**
14. Carboys Nos for	:	**barcode & Color & Appearance :colourless**
15. Water Consumption & W.W.G (KLPD)	:	**Ind :45000.000 , Dom :5000.000 & Ind :0.000 , Dom :4000.000**

Sr	Parameter	Unit	Test Method	Range of Testing	Result
1	pH	pH Units	4500 H+ B APHA Standard Methods 22nd edi.2012	1 – 14 pH value As or	7.54
2	Suspended Solids	mg/l	Gravimetric method. (2540 D APHA Standard Method	2 – 10000 mg/L	24
3	Fecal Coliform	MPN/100 ml	2.9221 E APHA 22nd Edition IS 1622-1981	<1.8 to >1600 MPN/10	70
4	B.O.D (3 Days 27oC)	mg/l	3 – Day BOD test. (IS 3025 (Part 44) 1993 Reaffirmed	05–50000 mg/l	12

Laboratory Remarks : Freeze By:251-r.o_251 Dt.: 03/05/2021

T. C. Barmeda

T.C Barmeda, SSO

Field Observation :

Note :

1. * - These parameters are NOT covered under the scope of NABL.
2. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied.
3. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.
4. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Board in writing.
5. The Board is not responsible for the authenticity for the samples not collected by the Board's officials.
6. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.
7. Permissible Limits: as per Schedule VI of EPA Rules, 1986 as ammended by Second and Third ammendment 1993 for Effluents
8. Physicochemical and microbiological parameters, Std.Methods for Water and Waste Water- 23rd Edition by APHA.
9. Bioassay test (for toxicity) -IS:6582:Part-2:2001; Reaffirmed 2007.

ANALYSIS REPORT FOR
WATER / WASTE WATER SAMPLE

Sample ID:313294 - Analysis Completion:08/10/2021

Ports and harbour, jetties and dredging operations / LAB Inward : 7026

Gujarat Pollution Control Board, Kutch West
Katira Commercial Complex-1, First Floor
Near Income Tax office, Manglam Char rasta ,Sanskar nagar,
BHUJ - 370 001

TEST REPORT

Test Report No. : 7026 **Date: 11/10/2021**

1. Name of the Customer	**: Adani Ports & Special Economic Zone Ltd. - 17739**
2. Address	**: 169/P,AT-NAVINAL ISLAND,MUNDRA, KUTCH Mundra-370421, Taluka : Mundra, District : Kutch East, GIDC : MPSEZ**
3. Nature of Sample	**: REP-Representative/Grab, (Insp Type : APP-On Application)**
4. Sample Collected By	**: MR. HARSH BAHECHARBHAI PATEL**
5. Quantity of Sample Received	**: 5 lits**
6. Code No. of the Sample	**: 313294**
7. Date & Time of Collection & Inwarding	**: 23/09/2021 , (1315 to 1316) & 27/09/2021**
8. Date of Start & Completion of Analysis	**: 27/09/2021 & 08/10/2021**
9. Sampling Point	**: ## Final Outlet of the ETP ~ sample collected from final outlet of ETP**
10. Flow Details (Remarks)	**: .....**
11. Mode of Disposal	**: on land for gardening and plantation**
12. Ultimate Receiving Body	**: onland for irrigation.**
13. Temperature on Collection	**: 30 & pH Range on pH Strip :7 to 8 on pH strip**
14. Carboys Nos for	**: barcode & Color & Appearance :COLOURLESS**
15. Water Consumption & W.W.G (KLPD)	**: Ind :1304.110 , Dom :370.000 & Ind :90.310 , Dom :263.000**

Sr	Parameter	Unit	Test Method	Range of Testing	Result
1	Temperature	Centigrade	IS: 3025 (Part – 9) – 1984(Reaffirmed 2006)	Ambient oC - 60 oC	30
2	pH	pH Units	4500 H+ B APHA Standard Methods 23rd edi.2012	1 – 14 pH value As or	7.76
3	Colour	Pt.Co.Sc.	2120 B APHA Standard Methods 22nd edi. 2012	2 - to 99 Hazen & 1-50	30
4	Total Dissolved Solids	mg/l	Gravimetric method. (2540 C APHA Standard Method	10 – 200000 mg/L	1624
5	Suspended Solids	mg/l	Gravimetric method. (2540 D APHA Standard Method	2 – 10000 mg/L	32
6	Ammonical Nitrogen	mg/l	1).Titrimetric method (4500 NH3 B & C APHA Standai	1 - 2000 mg/l.	1.12
7	Percent Sodium	%Na	IS11624-1986(Reaffirmed 2009)	0.01 – 100%.	55
8	Chloride	mg/l	Argentometric method. (4500 Cl? B APHA Standard M	1 - 50000 mg/l	490
9	Sulphate	mg/l	APHA(23rd edi) 4500 SO4 E	2-40mg/l	270
10	Chemical Oxygen Demand	mg/l	APHA (23rd Edition)- 5220 B Open Reflux Method-2(	5.0- 50000 mg/l	74
11	Oil & Grease	mg/l	Liquid – Liquid Partition Gravimetric method. (5520 B	01 – 1000 mg/l	1.2
12	Phenolic Compounds	mg/l	4 Amino Antipyrene method without Chloroform Extra	0.1 – 50 mg/l	0.0
13	B.O.D (3 Days 27oC)	mg/l	3 – Day BOD test. (IS 3025 (Part 44) 1993 Reaffirmec	05–50000 mg/l	24

Laboratory Remarks : Freeze By:251-r.o_251 Dt.: 11/10/2021

T. C. Barmeda

T.C Barmeda, ROH

Field Observation : colourless sample

Note :

1. * - These parameters are NOT covered under the scope of NABL.
2. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied.
3. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.
4. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Board in writing.
5. The Board is not responsible for the authenticity for the samples not collected by the Board's officials.
6. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.
7. Permissible Limits: as per Schedule VI of EPA Rules, 1986 as ammended by Second and Third ammendment 1993 for Effluents
8. Physicochemical and microbiological parameters, Std.Methods for Water and Waste Water- 23rd Edition by APHA.
9. Bioassay test (for toxicity) -IS:6582:Part-2:2001; Reaffirmed 2007.

Annexure – 6

GPCB

GUJARAT POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN
Sector-10-A, **Gandhinagar**-382 010
Phone : (079) 23226295
Fax : (079) 23232156
Website : www.gpcb.gov.in

By R.P.A.D.

In exercise of the power conferred under section-25 of the Water (Prevention and Control of Pollution) Act-1974, under section-21 of the Air (Prevention and Control of Pollution)-1981 and Authorization under rule 6(2) of the Hazardous and Other Waste (Management and Transboundary) Rules, 2016 framed under the Environmental (Protection) Act-1986.

And whereas Board has received consolidated consent application **inward no. 193334** dated **03/04/2021** for the **Renewal of Consolidated Consent and Authorization (CC&A)** of this Board under the provisions / rules of the aforesaid Acts. Consents & Authorization are hereby granted as under:

CONSENTS AND AUTHORISATION:
(Under the provisions /rules of the aforesaid environmental acts)

To,
M/s Adani Ports & Special Economic Zone Ltd, (WFDP- West Port),
Survey No: 141, Navinal Island,
Vill: Mundra,
Tal- Mundra,
Dist-Kutch.370421.

1. **Consent Order No.AWH-113458 Date of Issue: 28/06/2021.**
2. The consents shall be **valid upto01/02/2027** for the use of outlet for the discharge of trade effluent and emission due to operation of industrial plant for following items/ products:

Sr.No.	Product	Capacity per Month
1.	Dry Cargo Handling	6,00,00,000 MT

SUBJECT TO THE FOLLOWING SPECIFIC CONDITIONS:

1. Applicant shall comply with conditions of Environment Clearance issued vide order no. 10-47/2008-IA-III dated 12/01/2009.
2. Applicant shall take adequate measure to control fugitive emission in surrounding areas.
3. Applicant shall carry out adequate plantation in and around the port area.
4. Unit shall strictly comply with guideline of this Board for coal handling units.
5. No existing mangroves shall be destroy during any activities.
6. No ground water shall be withdrawal without prior permission from CGWA as per Hon'ble NGT order.
7. Industry shall provide dedicated storage area for coal with adequate water sprinkling system to control fugitive emission.

8. Industry shall renew PLI Policy time to time & submit a copy of the same to this office.

3. CONDITIONS UNDER WATER ACT 1974:

3.1 Source of Water: -GWIL.

3.2 The quantity of the fresh water consumption for industrial purpose shall not exceed 6000 KLD. Industrial water mainly uses for sprinkling, dust suppression etc.

3.3 The quantity of the fresh water consumption for domestic purpose shall not exceed 60 KLD.

3.4 There shall be no generation of industrial effluent from the manufacturing process and other ancillary industrial operations.

3.5 The quantity of the domestic waste water (Sewage) shall not exceed 50 KL/Day.

3.6 Industry shall operate Sewage Treatment Plant (STP) adequately so that treated domestic effluent shall conform to the following norms:

PARAMETERS	PRESCRIBED LIMITS
pH	6.5 to 9.0
BOD (5 days at 20° C)	30 mg/L
Suspended Solid	100 mg/L
Fecal Coliform	<1000 MPN /100 ml

3.7 Treated sewage conforming to above standard shall be discharge on land for gardening and plantation within premises only.

3.8 Industry shall provide fixed pipeline network with flow meter for even distribution of sewage and maintain its record.

3.9 Disposal system for storm water shall be provided separately. In no circumstances storm water shall be mixed with the other effluent.

4. CONDITIONS UNDER AIR ACT 1981:

4.1 The following shall be used as fuel in the D.G Sets

Sr. no.	Name of Fuel	Quantity
1.	HSD	159 Liter/Hour

4.2 The applicant shall install & operate air pollution control system in order to achieve flue gas emission norms as prescribed below.

Sr. no.	Stack attached to	Stack height in meters	Parameter	Permissible limit
1.	D.G. Sets (2 Nos.) (1500 KVA each) (stand by)	20 (each)	PM SO_2 NO_X	150 mg/Nm^3 100 ppm 50 ppm

4.3 There shall be no process gas emission from manufacturing activities and other ancillary operations.

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4.4 Industry shall comply with coal handling guideline of this Board.

A. Dust containment cum suppression system for the coal stack, loading and unloading.
B. Construction of effective wind breaking wall suitable to local condition to prevent the suspension of particles from the heaps.
C. Construction of metal road & RCC Pacca flooring in the plot area/ godown etc.
D. System for regular cleaning and wetting of the floor area within the premises.
E. Entire coal storage area/ godown should be covered with permanent weather shed roofing and side walls i.e., in closed shed, in case of crushing/ sieving/ grading activity is carried out (i.e. G. I. Sheet) along with adequate additional APCM should be installed.

4.5 The concentration of the following parameters in the ambient air within the premises of the industry and a distance of 10meters from the source) other than the stack/vent) shall not exceed the following levels.

Sr. No.	Pollutant	Time Weighted Average	Concentration in Ambient air in µg/M^3
1.	Sulphur Dioxide (SO_2)	Annual 24 Hours	50 80
2.	Nitrogen Dioxide (NO_2)	Annual 24 Hours	40 80
3.	Particulate Matter (Size less than 10 µm) or PM_{10}	Annual 24 Hours	60 100
4.	Particulate Matter (Size less than 2.5 µm) or $PM_{2.5}$	Annual 24 Hours	40 60

4.6 The applicant shall provide portholes, ladder, platform etc at chimney(s) for monitoring the air emissions and the same shall be open for inspection to/and for use of Board's staff. The chimney(s) vents attached to various sources of emission shall be designed by numbers such as S-1, S-2, etc. and these shall be painted/displayed to facilitate identification.

4.7 The industry shall take adequate measures for control of noise levels from its own sources within the premises so as to maintain ambient air quality standards in respect of noise to less than 75dB(A) during day time and70 dB (A) during night time. Daytime is reckoned in between 6a.m. and10 p.m. and nighttime is reckoned between 10 p.m. and 6 a.m.

4.8 D.G. Sets Conditions

The D.G. Set shall have acoustic enclosure and shall comply with the standards specified at Sr. no. 95 of Schedule-I of the rule-3 of E.P. Rules -1986 and Noise pollution level as per the Air Act-1981

D.G. Sets standards:-

The flue gas emission through stack attached to D.G. Sets shall conform to the following standards.

a) The minimum height of stack to be provided with each of the generator set shall be H=h + 0.2 (KVA) 1/2, where H= Total stack height in meter, h= height of the building in meters where or by the side of which the generator set is installed.

b) Noise from DG set shall be controlled by providing an acoustic enclosure or by reating the room acoustically, at the users end.

c) The acoustic enclosure or acoustic treatment of the room shall be designed for minimum 25 dB (A) insertion loss or for meeting the ambient noise standards, whichever is on the higher side (if the actual ambient noise is on the higher side, it may not be possible to check the performance of the acoustic enclosure/ acoustic treatment. Such circumstances the performance may be checked for noise reduction up to actual ambient noise level, preferably, in the night time). The measurement for insertion loss may be done at different points at 0.5 m from the acoustic enclosure/room, and the averaged.

d) The D.G. Set shall be provided with proper exhaust muffler with insertion loss of minimum 25 dB (A).

e) All efforts shall be made to bring down the noise level due to the D.G. Set, outside the premises, within the ambient noise requirements by proper siting and control measures. Installation of a D.G. Sets must be strictly in compliance with the recommendations of the D.G. Set manufacturer.

f) A proper routine and preventive maintenance procedure for the D.G. Set should be set and followed in consultation with the DG Set manufacture which would help prevent noise levels of the DG Set from deteriorating with use.

5. Authorization under Hazardous & Other Waste [Management&Transboundary Movement] Rules, 2016 & amended.

5.1 Authorization order no:-AWH-113458 Date of issue: 28/06/2021.

5.2 **M/s. Adani Ports & Special Economic Zone Ltd,** is hereby granted an authorization to operate facility for following hazardous wastes on the premises situated at Plot No: Navinal Island, Vill: Mundra, Tal- Mundra, Dist-Kutch.

Sr. No.	Waste	Quantity per Annum	Category	Facility
1.	Used Spent Oil	238 MT	5.1	Collection, storage, Transportation, Disposal by selling out to registered recyclers/re-processer
2.	Contaminated cotton rags or other cleaning materials	31 MT	33.2	Collection, storage, Transportation, Disposal by co-processing at cement plant or CHWIF.

3.	Discarded Container	26 MT	33.1	Collection, storage, Transportation &Disposal by selling out to registered decontamination facility.

5.3 The authorization shall be valid up to 01/02/2027.

5.4 The authorization is subject to the conditions stated below and such other conditions as may be specified in the rules from time to time under the Environment (Protection) Act-1986.

5.5 The authorization is granted to operate a facility for collection, storage within factory premises transportation and ultimate disposal of Hazardous wastes as per condition no 5.2 to the industry having valid CCA of this Board.

5.6 **TERMS AND CONDITIONS OF AUTHORISATION**

1. The applicant shall comply with the provisions of the Environment (Protection) Act-1986 and the rules made there under.
2. The authorization or its renewal shall be produced for inspection at the request of an officer authorized by the Gujarat Pollution Control Board.
3. The persons authorized shall not rent, lend, sell, and transfer or otherwise transport the hazardous wastes without obtaining prior permission of the Gujarat Pollution Control Board.
4. Any unauthorized change in personnel, equipment or working conditions as mentioned in the authorization order by the persons authorized shall constitute a beach of this authorization.
5. The person authorized shall implement Emergency Response Procedure (ERP) for which this authorization is being granted considering all site specific possible scenarios such as spillages, leakages, fire etc. and their possible impacts and also carry out mock drill in this regard at regular interval of time;
6. The person authorized shall comply with the provisions outlined in the Central Pollution Control Board guidelines on "Implementing Liabilities forEnvironmental Damages due to Handling and Disposal of Hazardous Wastes and Penalty"
7. It is the duty of the authorized person to take prior permission of the Gujarat Pollution Control Board to close down the facility.
8. An application for the renewal of an authorization shall be made as laid down in rules 6(2) under Hazardous and Other Waste Rules, 2016.
9. The imported hazardous and other wastes shall be fully insured for transit as well as for any accidental occurrence and its clean-up operation.
10. The record of consumption and fate of the imported hazardous and other wastes shall be maintained.
11. The hazardous and other wastes which gets generated during recycling or reuse or recovery or pre-processing or utilization of imported hazardous or other wastes shall be treated and disposed of as per specific conditions of authorization.
12. The importer or exporter shall bear the cost of import or export and mitigation of damages if any.
13. Any other conditions for compliance as per the Guidelines issued by the Ministry of Environment, Forest and Climate Change or Central Pollution Control Board from time to time.

14. The waste generator shall be totally responsible for (i.e. collection, storage, transportation and ultimate disposal) the wastes generated.
15. Records of waste generation, its management and annual return shall be submitted to Gujarat Pollution Control Board in Form-4 by 30th day of June of every year for the preceding period April to March.
16. In case of any accident, details of the same shall be submitted on Form-11 to Gujarat Pollution Control Board.
17. As per "Public Liability Insurance Act-91" company shall get Insurance Policy, if applicable.
18. Empty drums and containers of toxic and hazard material shall be treated as per guideline published for "Management & Handling of discarded containers". Records of the same shall be maintained and forwarded to Gujarat Pollution Control Board regularly.
19. In case of transport of hazardous wastes to a facility for (i.e. treatment, storage and disposal) existing in a State other than the State where hazardous wastes are generated, the occupier shall obtain 'No Objection Certificate' from the State Pollution Control Board or Committee of the concerned State of Union Territory Administration where the facility exists.
20. Unit shall take all concrete measures to show tangible results in waste generation, reduction, avoidance, reuse and recycle. Actions taken in this regard shall be submitted within three months and also along with Form-4.
21. Industry shall have to display the relevant information with regards to hazardous waste as indicated in the Hon. Supreme Court's Order in W.P. No.657 of 1995 dated 14th October, 2003.
22. Industry shall have to display on-line data outside the main factory gate with regard to quantity and nature of hazardous chemicals being handled in the plant, including wastewater and air emissions and solid hazardous wastes generated within the factory premises.

6. **SPECIFIC CONDITIONS:-**

6.1 The authorized actual user of hazardous and other wastes shall maintain records of hazardous and other wastes purchased in a passbook issued by the State Pollution Control Board along with the authorization.

6.2 Handling over of the hazardous and other wastes to the authorized actual user shall be only after making the entry in the passbook of the actual user.

6.3 In case of renewal of authorization, a self-certified compliance report in respect of effluent, emission standards and the conditions specified in the authorization for hazardous and other wastes shall be submitted to SPCB.

6.4 The occupier of the facility shall comply Standard operating procedure/guidelines published by MOEF&CC or CPCB or GPCB from time to time.

6.5 Unit shall comply provisions of E-Waste Management Rules-2016.

6.6 The disposal of Hazardous Waste shall be carried out as per the waste Management hierarchy.

6.7 The occupiers of facilities shall not store the hazardous and other wastes for a period not exceeding **ninety days**. Prior permission of the Board shall be obtained for extension of the storage period.

6.8 The occupier shall maintain the records of generation, sale, storage, transport, recycling, co processing and disposal of hazardous waste and make available during the inspection.

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6.9 The transportation of the hazardous waste shall be carried out in GPS mounted dedicated vehicles.

7. **GENERAL CONDITIONS: -**

7.1 Any change in personnel, equipment or working conditions as mentioned in the consents form/order should immediately be intimated to this Board.

7.2 Applicant shall also comply with the general conditions given in annexure I.

7.3 Whenever due to accident or other unforeseen act or ever, such emissions occur or is apprehended to occur in excess of standards laid down such information shall be forthwith reported to Board, concerned Police Station Office of Directorate of Health Service, Department of Explosives, Inspectorate of Factories and local body.

7.4 In case of failure of pollution control equipments, the production process connected to it shall be stopped. Remedial actions/measures shall be implemented immediately to bring entire situation normal.

7.5 The Environmental Management Unit/Cell shall be setup to ensure implementation on and monitoring of environmental safeguards and other conditions stipulated by statutory authorities. The Environmental Management Cell/Unit shall directly report to the Chief Executive of the organization and shall work as a focal point for internalizing environmental issues. These cells/units also coordinate the exercise of environmental audit and preparation of environmental statements.

7.6 The Environmental audit shall be carried out yearly and the environmental statements pertaining to the previous year shall be submitting to this State Board latest by 30th September every year.

7.7 The Board reserves the right to review and/or revoke the consent and/or make variations in the conditions, which the Board deems, fit in accordance with Section 27 of the Act.

7.8 In case of change of ownership/management the name and address of the new owners/ partners/directors/proprietor should immediately be intimated to the Board.

7.9 Industry shall have to display the relevant information with regard to hazardous waste as indicated in the Hon. Supreme order in w.p. no. 657 of 1995 dated 14th October 2003.

For and on behalf of
GUJARAT POLLUTION CONTROL BOARD

(Smt. U.K. Upadhyay)
Senior Environment Engineer

NO: PC/ CCA- KUTCH- 582(4)/ ID 35427/Date: 595234 dt- 16/7/21

ISSUED TO:
M/s. Adani Ports & Special Economic Zone Ltd,(WFDP- West Port),
Plot No: Navinal Island,
Vill: Mundra,
Tal- Bhuj,
Dist-Kutch. 370421.

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CCA-Amendment
(AH-113548)

No. : PC/CCA-KUTCH-1437/GPCB ID-53331/ 595228 **Date:** 16/7/21

To,
M/s. Mundra LPG Terminal Private Limited,
Near Plot No.169/P,
Navinal Island, Mundra,
Tal: Mundra
Dist: Kutch – 370421.

SUB: Amendment in the consolidated consent & Authorization of the Board.

REF: 1) CCA issued by this office vide order no. **AWH- 103906**dated 04/09/2019 valid up to 27/06/2024.
2) CTE Amendment issued by this office vide order no.**CTE-111751** dated 26/03/2021 valid up to 01/03/2026.
3) Your CCA-Amendment Application vide Inward ID No.**193350** dated **15/04/2021.**

In exercise of the power conferred under section-25 of the Water (Prevention and Control of Pollution) Act-1974, under section-21 of the Air (Prevention and Control of Pollution)-1981 and Authorization under rule 6(2) of the Hazardous And Other Waste (Management and Transboundary) Rules, 2016 & framed under the Environment (Protection) Act-1986, The Board has granted CCA vide order No. **AWH- 103906** issued vide this office order no. **PC/CCA-KUTCH-1437/GPCB ID- 53331/ 526517** dated 09/11/2019, valid up to 09/03/2024.

The Board has right to review and amend the conditions of the said CCA orders. Now, considering your application for CCA-amendment inward ID No.**193350 dated 15/04/2021, addition of LPG fired boiler (12 TPH) & increased Hazardous Waste quantity. The said CCA issued** vide order No. **AWH- 103908, dated 04/09/2019is amended as below:**

1. **The order shall be read as CCA amendment Order No.: AH- 113548 Date of Issue: 01/07/2021, valid up to27/06/2024.**

SUBJECT TO THE FOLLOWING SPECIFIC CONDITIONS:

1. There shall be no change in existing LPG storage handling & distribution capacity (Total Storage of LPG cap: 50,000 MTPA, 2 nos. of tanks), due to CCA- amendment.
2. There shall be no change in existing quantity of water consumption, waste water generation and its mode of disposal due to CCA-amendment.
3. Industry shall not carry out any activity which attracts provisions of EIA Notification-2006 as amended.
4. Industry shall manage Solid Wastes generated from industrial activities as per Solid Waste Management Rules-2016 (solid waste as defined in Rule-3(46)).

5. Industry shall comply with Manufacture, Storage, Import, Hazardous & Chemicals Rules-1989 (MSIHC) and amendment therein including site notification issued by competent authority as per Schdule-5 & submit a copy of the same to this office.
6. Industry shall submit updated safety audit report & onsite emergency plan as per MSIHC Rules.
7. Industry shall renew Public Liability Insurance Policy time to time & submit a copy of the same to this office.
8. Industry shall renew PESO permission time to time &submit a copy of the same to this office.

2. Conditions no.4.1 & 4.3 of the said CCA order is amended as below:

4.1 The following shall be used as fuel in the Steam Boilers & D.G. Set respectively;

Sr. No.	Utility	Fuel	Quantity	
			Existing	Total after CCA-Amendment
1.	Steam Boilers (12 TPH) (1Nos. existing & 1 nos. New) (total no. 2) & (14 TPH (1 Nos.) (existing)	LPG	474 Kg/Hr	2000 Kg/Hr
2.	D.G. Set (2000 KVA)	HSD	390 Liter/Hr	390 Liter/Hr

4.3 The flue emission through stack attached to Steam Boilers &D.G. Set shall conform to the following standards;

Sr. No	Stack attached to	Stack height in Meters	APCM	Parameter	Permissible limit
1.	Steam Boilers (Total 2 Nos.) (12 TPH (1Nos.) & 14 TPH (1 Nos.)) (Existing)	35 Common Stack	Adequate Stack height	PM SO_2 NO_x	150 mg/Nm^3 100 ppm 50 ppm
2.	Steam Boiler (12 TPH, 1 Nos.) (New)				
3.	D.G. Set (1 nos.) (2000 KVA) (Existing)	11	Adequate Stack height	PM SO_2 NO_x	150 mg/Nm^3 100 ppm 50 ppm

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3. Condition no. 5.1 & 5.2 of the said CCA order is amended as below:

5.1 This order shall be read as Authorization order no: **AH-113548**Date of issue: 01/07/2021.

5.2 **M/s. Mundra LPG Terminal Private Limited,** is hereby granted an authorization to operate facility for following hazardous wastes on the premises situated at Near Plot No.169/P, Navinal Island, Tal : Mundra, Dist: Kutch.

Sr. No	Waste	Quantity per Annum			Sch-Cat.	Facility
		Existing	Proposed	Total after CCA-Amendment		
1.	Used/ Spent Oil	1MT	7.5 MT	7.5 MT	I-5.1	Collection, storage, Transportation & disposal by reuse within premises and / or selling out to registered recyclers/ reprocessor.
2.	Discarded drum/ containers	5 MT	--	5 MT	I-33.3	Collection, storage, Transportation & disposal by selling to registered recycler/ re-processor.
3.	Oily Cotton rags	5 MT	--	5 MT	I-33.2	Collection, storage, Transportation and disposal by co-processing at cement industries.
4.	Sludge and filters contaminate with oil	--	0.2 MT	0.2 MT	I-3.3	Collection, storage, Transportation & disposal by selling out to registered recyclers/ reprocessor.

4. The rest of the conditions of the above referred CCA order no. AWH- 103906 dated 04/09/2019 shall remain unchanged. You are directed to comply with these conditions judiciously.

For and on behalf of
GUJARAT POLLUTION CONTROL BOARD

(Smt. U.K. Upadhyay)
Senior Environment Engineer

GUJARAT POLLUTION CONTROL BOARD

GPCB

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CORRECTION TO CONSOLIDATED CONSENT TO AUTHORIZATION (CC & A)

NO: PC/ CCA- KUTCH-39(7) /GPCB ID 17739/ **Date:**

To
M/s. Adani Ports & Special Economic Zone Limited,
Plot no. 169/P,
At-Navinal Island,
Tal: Mundra,
Dist: Kutch - 370 421

SUB: Correction in Consolidated consent & Authorization (CC &A)
REF: 1) Consolidated consent & Authorization (CC&A) order no. AWH- 83561 vide order no. PC/CCA-KUTCH 39(4) /GPCB ID 17739/ 403658 dated 09/02/2017.
2) Your letter dated 01/09/2020.

In exercise of the power conferred under section-27 of the Water (Prevention and Control of Pollution) Act-1974, under section-21 of the Air (Prevention and Control of Pollution)-1981 and Authorization under rule 6(2) of the Hazardous & Other Waste (Management & Transboundary Movement) Rules-2016 and without reducing your responsibility under the said Acts/ Rules in anyway

And whereas Board is empowered to amend consent order conditions.

Accordingly, CCA order no. AWH-83561 vide order no. PC/CCA-KUTCH 39(4) /GPCB ID 17739/ 403658 dated 09/02/2017 is hereby corrected as below:

1. Sr. no. 2 of conditions no. 5.2 of the said CC&A order no. AWH-83561 vide order no. PC/CCA-KUTCH 39(4) /GPCB ID 17739/ 403658 dated 09/02/2017 shall be read as under:

Sr. No.	Waste	Quantity per Annum	Schedule &Category	Facility
2.	ETP Sludge	109.5 MT	I-34.3	Collection, Storage, Transportation and disposal by co-processing at cement industries and /or CHWIF site.

2. Rest of all conditions mentioned in CCA order no.AWH-83561 issued vides this office order no. PC/CCA-KUTCH 39(4) /GPCB ID 17739/ 403658 dated 09/02/2017 & industry shall comply with the same judiciously.

For and on behalf of
Gujarat Pollution Control Board

(Smt U.K. Upadhyay)
Environment Engineer

Annexure – 7

Forwarding & Undertaking Letter from Industry

Application for consent for establishing / operation the industrial plant / plants under Section 21 of the Air (prevention & Control of Pollution) Act, 1981

Important Note : This Document or its copy does "NOT" serve as a Supporting Document Proof of Industry's Submission of an Application for a NOC / Consent. This Letter does "NOT" ensure that the Application FEES has been paid.

Application Purpose : Applying for the CCA renewal, there are no changes in details related to Air, Water & Hazardous waste, Previous CC&A order is - Order No. AWH-83561, vide letter No. PC/ CCA – KUTCH -39(4)/ ID 17739/403658 valid up to 20/11/2021.

Print Date: 23/09/2021

From : **Adani Ports & Special Economic Zone Ltd., Category: RED / LARGE**
PLOT NO: 169/P,
at-navinal island, mundra, kutch,
Mundra - 370421
Contact Person: Chirag Rajput, Mob:6359981629, Ph:02838255187
DIST: Kutch East, TAL: Mundra, SIDC: MPSEZ

PCB-ID : 17739
INWARD : 202362
Dt:19/09/2021

Scrutinized By: B.M.Dolasiya,SSA(M)(452)

To,
The Member Secretary,
Gujarat Pollution Control Board
Paryavaran Bhavan, Sector-10/A,
Gandhinagar - 382010

I / We here by Submitting application for CCA ,Inward No : 202362 ,Date : 19/09/2021 for COW(CCA-Renewal).

Applying For : A,W,H Validity : 5 Years Grant By : CHR

Air Sector :20000~Large Scale Industry Water Consumption : 1674.110 klpd

Haz Sector : 5000~Large Scale Industry No of Plants : 1 Incenerator : 0

Investment	Air	Water	Hazardous
3394.621 Crs	20000	40000	5000+30000
0 Rs	5 Years	5 Years	5 Years

Payable Fees : Air : 100000, Water : 200000, Haz : 175000

Paid Amount : 475000, DD No : WAXC0277668539, Dt: 9/18/2021, at AXC , ***

Query / Reply:

	I / We have Uploaded the following PDFs	Date	# Files	Size(kb)	#Page
1	000 - Any Specific Information Called for [in SCRUTINY]	10/09/21	1	193869	940
2	ENV - Environment Statement , Form-V	06/09/21	1	4248	14
3	APC - Air Pollution Control Measures-Details	25/08/21	1	14708	59
4	ANN - Annual Return : Form 4	13/05/21	1	3132	10
5	SHT - Storage Handling & Transportation Plan	13/10/20	1	29251	96
6	EIA - Executive Summary Statement	22/04/20	1	41910	195
7	CER - Compliances for Reconsideration of Rejected-NOC	29/05/18	1	6698	35
8	C&A - Previous Consent-Reject / CCA Order / NOC Order	26/03/18	1	20175	136
9	SSI - SSI-IEM-C.A Certi / Investment Proofs	30/12/16	1	1375	8
10	CMP - Compliance of earlier CCAs - (ONLY Renewal cases)	22/09/16	1	22695	157
11	PLI - PLI Policy	10/06/16	1	564	8
12	PLL - Plan LayOut + Site Plan	17/03/15	1	2221	3
13	WAT - *** BreakUp of Water Uses & balance	10/11/08	1	231	2
14	INV - *** Pls ADD this file in SSI tag- Previous Cases	10/11/08	1	221	1
15	HW3 - *** N.A Now !!! (Details of HW - 2008 rules)	06/09/08	1	1239	4
16	PHT - *** Photos of Haz Waste Storage Facilities	06/09/08	1	91	2
17	RAW - *** Raw materials / Products with QTY-Month	06/09/08	1	11	1
18	EAR - Env. Audit Compliance/Auditor Recommendations,3Pgs		0	0	0

I, the applicant declare that I have submitted full and complete documents and information in conformity to the applicable acts / rules. I am aware that, any delay / rejection in the processing of application on account of incorrect / incomplete information shall be mine responsibility.

Company s SEAL **1 (Through XGN)** O/C 21/09/2021

(Bhagwat Swaroop Sharma, Head - Environment, Adani Ports & SEZ Ltd.)

Note: I am hereby enclosing Form-I(AIR),Form-D(WATER),Form-1(HAZARDOUS) along with my application.
Please Attach Copy of NEFT/RTGS Challan with this Letter if you are paying through NEFT/RTGS.

Company s SEAL

2 (Through XGN)

N | C

Annexure – 8

TÜVRheinland®
Precisely Right.

Certificate

Standard: **Zero Waste to Landfill Management System (ZWTL MS 2020)**

Certificate Holder: **Adani Ports and Special Economic Zone Limited**
Mundra Port, Kutch - 370421,
Gujarat,India

Scope: **Providing Port Facilities for Import and Export of Bulk, Break Bulk, Liquid and Containerized Cargo, its Storage and RORO Operation for Export of Vehicles**

Proof has been furnished by means of an audit that the Requirements of ZWTL MS 2020 are met, with the achievement of waste diversion rate of above 99%

Validity: This certificate is valid from 01-06-2021 until 31-05-2024
Subject to satisfactory annual surveillance audits.

Certificate No. TUV/ZWLMS/2021/Adani Ports/0501

New Delhi, 01-06-2021

TÜV Rheinland India Pvt. Ltd.
Office 610, 6rd Floor, iThum Tower, A–40, Sector-62, Noida- 201301, India

CII-ITC Centre of Excellence for Sustainable Development

Confederation of Indian Industry

Certificate

Single-use Plastic Free

Adani Ports and Special Economic Zone Limited

Adani Mundra Port, Adani House, PO Box No. 1, Mundra, Kutch 370 421, Gujarat, India

This is to certify that Adani Ports and Special Economic Zone Limited, at the location mentioned above, is Single-use Plastic Free as verified by the Confederation of Indian Industry, under the provisions of the **Plastics-use Protocol: Verification and Certification (1.0)**.

This Certificate is valid from 26 May 2021 to 25 May 2022.

PLASTICS-USE PROTOCOL

CONFEDERATION OF INDIAN INDUSTRY CII NEW DELHI

Ms Seema Arora
Deputy Director General
Confederation of Indian Industry (CII)
Centre of Excellence for Sustainable Development (CESD)

Certificate Date: 07 June 2021

Certificate No.: CII/PuP/2021/012

This certificate has been awarded after the company fulfilled the requirements for phasing-out single-use plastics and providing evidence for it. Responsibility for the data provided to CII rests solely with the company. The conditions of certification and terms are detailed in the Annex.

Annex

The certification applies to the following single-use plastic items:

- Cutlery (knives, forks, spoons, chopsticks)
- Crockery (plates, glasses, cups, lids, bowls)
- Food containers
- Straws
- Stirrers
- Carry bags
- Items of decoration (polystyrene)
- Garbage bags

Organizational Boundary: Adani Ports and Special Economic Zone Limited

Operational Boundary: Administration, canteen, kitchen and operational areas

Material Boundary: Single-use Plastics

Reference
Verification Date: 26 May 2021
Verification Report No.: PuP/Verification/2021/AdaniPorts/004
Mode: On account of the COVID-19 pandemic, the verification process was virtual and followed provisions outlined in the Verification Procedure 1.0 of the Protocol

Annexure – 9

Cost of Environmental Protection Measures

Sr. No.	Activity	Cost incurred (INR in Lacs)			Budgeted Cost (INR in Lacs)
		2019 – 20	2020 – 21	2021 – 22 (Till Sep'21)	2021 – 22
1.	Environmental Study / Audit and Consultancy	0.33	6.2	6.82	7.0
2.	Legal & Statutory Expenses	0.84	10.58	10.04	12.0
3.	Environmental Monitoring Services	21.74	19.17	9.56	20.0
4.	Hazardous / Non-Hazardous Waste Management & Disposal	108.43	83.55	57.64	114.10
5.	Environment Days Celebration and Advertisement / Business development	1.5	5.3	1.81	7.0
6.	Treatment and Disposal of Bio-Medical Waste	1.62	2.09	0.89	2.04
7.	Mangrove Plantation, Monitoring & Conservation	Nil	32.59	Nil	Nil
8.	Other Horticulture Expenses	734.18	689	605.58	865.11
9.	O&M of Sewage Treatment Plant and Effluent Treatment Plant (including STP, ETP of Port & SEZ & Common Effluent Treatment Plant)	110.18	148.49	95.53	219.24
10.	Expenditure of Environment Dept. (Apart from above head)	105.13	89.11	88.28	85.35
	Total	**1083.95**	**1086.08**	**876.15**	**1331.84**

Annexure – 10

adani

Ports and Logistics

o/c

PCB ID: 35427

APSEZL/EnvCell/2021-22/007

Date: 12.04.2021

To,
Regional Officer,
Regional Office (East – Kutch),
Gujarat Pollution Control Board,
Gandhidham – 370201.

Subject: Submission of compliance to observation/suggestion/instruction made by GPCB officials during inspection.

Reference: GPCB Inspection letter dated 09.04.2021, PCB ID: 35427 (**Annexure – A**)

Dear Sir,

With reference to the above mentioned subject and references, APSEZ is submitting the compliance details of your instruction are as below:

Our Reply against your Observation / Suggestion:

<table>
<tr><th>Observation / Suggestion</th><th>Our Reply / Compliance</th></tr>
<tr><td>Point No. 1</td><td>• Due to summer season and high temperature, at some places spontaneous ignition occurs in coal storage yard. For that regular water sprinkling is being practised within the coal stack yard to combat the fire, which was also observed during your site visit. Photographs showing the same are attached as Annexure – B.
• We have adequate firefighting system such as 432 nos. of sprinklers and 278 hydrants, 26 wet riser system & 11 dry riser system, water bowser, water monitor, etc. for firefighting at coal yard.</td></tr>
<tr><td>Point No. 2</td><td>• Last three months data for cargo handling, water consumption & wastewater generation are as below.
<table>
<tr><th>Sr. No.</th><th>Month</th><th>Cargo Handling in MT</th><th>Water Consumption in KL</th><th>Domestic Wastewater Generation in KL</th></tr>
<tr><td>1.</td><td>Jan-21</td><td>3191428</td><td>88250</td><td>600</td></tr>
<tr><td>2.</td><td>Feb-21</td><td>1788990</td><td>94526</td><td>550</td></tr>
<tr><td>3.</td><td>Mar-21</td><td>2453987</td><td>68027</td><td>661</td></tr>
</table></td></tr>
</table>

APSEZ is submitting the compliances regularly and hope the above mentioned submission is in line with requirement.

Thanking you,
For, **Adani Ports and Special Economic Zone Limited**

Bhagwat Swaroop Sharma
(Head – Environment Mundra & Tuna Port)

16-04-21

Received
Gujarat Pollution Control Board
Regional Office
Kutch (East)

Copy to:
Unit Head (Kutch Unit),
Gujarat Pollution Control Board,
Paryavaran Bhavan, Sector – 10A, Gandhinagar – 382010.

Adani Ports and Special Economic Zone Ltd
Adani House,
PO Box No. 1
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PCB ID: 35427

ANNEXURE – A

GPCB Inspection Letter

ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ

પ્રાદેશિક કચેરી : કચ્છ (પૂર્વ)

[illegible]

પ્રતિ,

Adani Port & SEZ (West Port)

તારીખ : 07/04/21

જીપીસીબી આઈડી : 35427

ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડના અધિકારીઓ દ્વારા આપના એકમની આજરોજ જુદા જુદા પર્યાવરણીય નિયમોને આધિન સ્થળ મુલાકાત લેવામાં આવેલ.આપના એકમના સ્થળ મુલાકાત દરમ્યાન કરેલ અવલોકનો, આપે આપેલ માહિતી / દસ્તાવેજો અને પર્યાવરણીય નિયમોની જોગવાઇ આધીન, આપને નીચે મુજબ સુચનાઓ આપવામાં આવે છે જેની પૂર્તતા / સ્પષ્ટતા અંગેનો અહેવાલ (કોમ્પલાયન્સ રીપોર્ટ) આ આદેશ મળ્યાની તારીખથી કામકાજના દિવસ-3 માં લેખીત/એસએમએસ/ઇલેક્ટ્રોનિક માધ્યમ મારફતે બોર્ડની વડી કચેરી ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, પર્યાવરણ ભવન, સેક્ટર ૧૦-એ, ગાંધીનગર-૩૮૨૦૧૦ ને આ કચેરીની જાણ હેઠળ અચૂક મોકલી આપશો.

(1) મુલાકાત સમયે coal storage yard માં [illegible] સ્થળોએ [illegible] ઢગલા [illegible] આવેલ છે. [illegible] વધારવા [illegible] પગલા લેવા.

(II) Last 03 month cargo Handling data, water consumption & wastewater generation data [illegible] documents [illegible]

Harshal Parmar
AEE

Harsh Patel
AEE

એકમના પ્રતિનિધિનું નામ અને હોદ્દો

Mr. Bhagwat Sharma
(Sr. Manager)

Adani Ports and Special Economic Zone Ltd
Adani House,
PO Box No. 1
Mundra, Kutch 370 421
Gujarat, India
CIN: L63090GJ1998PLC034182

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ANNEXURE – B

Photographs showing Water Sprinkling for Fire Fighting

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Ports and Logistics

PCB ID: 17739

APSEZL/EnvCell/2021-22/066

Date: 28/09/2021

To
The Regional Officer,
Regional Office GPCB (Kutch-East)
Gandhidham, 370201

Sub : Submission of compliance to observation/suggestion/instruction made by GPCB officials during inspection.

Reference : GPCB Inspection letter dated 23.09.2021, PCB ID: 17739 **(Annexure – A)**

Respected Sir,

With reference to the above mentioned subject, M/s. Adani Ports and Special Economic Zone Limited (APSEZL) hereby submitting the compliance details w.r.t. your observations as below:

Compliance against Point No. 1: Last three months details of production (material handling), water consumption, wastewater generation & disposal, and hazardous generation and disposal mentioned are as below table.

Sr. No.	Particular	June 2021	July 2021	August 2021
1.	Production (material handling)			
	General Cargo + Dry Cargo (MT)	1129417	1162874	703021
	Liquid Cargo (Chemical & POC Products) (MT)	216972	325053	292754
	Veg oil (MT)	52573	45676	77255
	Bitumen (MT)	5088	8067	2666
	Containers Handling (TEUs)	381342	410342	404175
2.	Total water consumption (KL)	48533	39027	42291
3.	Waste water Generation (Industrial + Domestic) (KL)	2547	2984	2815
4.	Treated wastewater (Industrial + Domestic) (KL)	2370	2897	2738
5.	Hazardous waste generation/disposal (MT)			
	• Pig Waste (co-processing)	1.70	1.20	2.03
	• oily rags (co-processing)	8.17	6.08	12.21
	• Used Oil (recycling)	37.431	-	-
	Total	47.301	7.28	14.24

07/10/21
Gujarat Pollution Control Board
Head Office
Sector No. 18-A,
Gandhinagar-382010

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Logistics

Compliance against Point No. 2: Since, last three months there was no any tank washing activity was being carried out. Hence, nil wastewater generated from tank washing activity.

Sir, kindly consider our compliance against the given written instructions and acknowledge the same.

Thank you
Yours Faithfully,

For. M/s. Adani Ports and Special Economic Zone Limited (APSEZL)

Bhagwat Swaroop Sharma
Head – Environment

Encl As above
Copy to: Unit Head GPCB - Head Office, Paryavaran Bhavan Sector 10 A Gandhi Nagar 382010

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ANNEXURE – A

ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ
પ્રાદેશિક કચેરી : કચ્છ (પૂર્વ)
દિનદયાળ પોર્ટ ટ્રસ્ટનું વહીવટ ભવન રૂમ નં. ૨૧૫, ૨૧૬, ૨૧૭, બીજો માળ,
સેક્ટર નં. ૮, ગાંધીધામ-૩૭૦૨૦૧, કચ્છ. ફોન : ૦૨૮૩૬-૨૩૫૯૦૮

પ્રતિ,
Adani Ports and Special Economic Zone તારીખ : 23/09/2021
At Navinal, Mundra, Kutch જીપીસીબી આઈડી : 17731

ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડના અધિકારીઓ દ્વારા આપના એકમની આજરોજ જુદા જુદા પર્યાવરણીય નિયમોને આધિન સ્થળ મુલાકાત લેવામાં આવેલ.આપના એકમના સ્થળ મુલાકાત દરમ્યાન કરેલ અવલોકનો, આપે આપેલ માહિતી / દસ્તાવેજો અને પર્યાવરણીય નિયમોની જોગવાઈ આધિન, આપને નીચે મુજબ સુચનાઓ આપવામાં આવે છે જેની પૂર્તતા / સ્પષ્ટતા અંગેનો અહેવાલ (કોમ્પલાયન્સ રીપોર્ટ) આ આદેશ મળ્યાની તારીખથી કામકાજના દિવસ-૩ માં લેખીત/એરજીઓન/ઈલેક્ટ્રોનિક માધ્યમ મારફતે બોર્ડની વડી કચેરી ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, પર્યાવરણ ભવન, સેક્ટર ૧૦-એ, ગાંધીનગર-૩૮૨૦૧૦ ને આ કચેરીની જાણ હેઠળ અચૂક મોકલી આપવો.

1. છેલ્લા ત્રણ મહિનામાં થયેલા ઓપરેશન Production (Material Handling), water consumption, wastewater generation, disposal detail, Hazardous waste generation and disposal detail રજૂ કરવી.
2. આપના દ્વારા provide કરેલ storage tanks અને તેના pipeline ના washing activity ના રેકર્ડ રજૂ કરવા. last three months ના washing activity, waste water generation ની વિગતો આપવી.

G. R. Nakum
APE

H. B. Patel
AEE

એકમના પ્રતિનિધિનું નામ અને સહી
Mr. Bhagvat Sharma

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Annexure – 11

HDFC ERGO General Insurance Company Limited

CONFIRMATION OF INSURANCE COVER

Date: 21st Oct 2021

To,
Mundra LPG Private Limited

Navinal Island, PO Box No. 1,
Taluka: Mundra,
District: Kutch, Gujarat, India.

Public Liability Act Insurance Policy

Dear Sir / Madam,

We would like to thank you for having preferred us for your Insurance requirements and hereby confirm acceptance of below captioned risk, basis the details given below:

Name of the Insured	Mundra LPG Private Limited
Type of Policy	Public Liability Act Insurance Policy
Type of Business	New Businesss
Quote No	RF10202100393175
Policy Period	From :13/10/2021 to 12/10/2022
Terms and Conditions	As per approved Quote
Intermediary Name	ACE INSURANCE BROKERS PVT LTD.
Policy Sum Insured	AOA : 5,00,00,000 AOY: 15,00,00,000
Policy Premium with GST	INR 11,801/-

Payment Details:

Payment Details	Premium
To be taken from CD	11,801/-

Note:

1. This letter is being issued in interim till Policy is issued by the Company in due course. Terms and conditions of the coverage shall be as per the policy document issued.

For, HDFC ERGO GENERAL INSURANCE CO. LTD

Authorised Signatory

Annexure – 12

Compliance Report of EMP & Mitigation Measures

Sr. No.	Suggested Measures	Compliance Status
✍ **Construction Phase:**		
1	Proper care is warranted while dredging which should be in a controlled manner. It should also be insured that reclamation, dredging, widening and slop stabilization measures do not significantly alter the stabilized erosional-accretional regime and prevailing rate of exchange of water between the outer area of the intricate creek system as well as the free flow of tidal water, to protect the mangroves.	All construction and operation activities as well as dredging and reclamation activities are being carried out as per the approvals. Please refer condition no. 8 & 9 of the CRZ recommendation compliance report for further details.
2	Good sanitation, water and fuel should be made available to the work force. Labour colonies should be set-up landward of the HTL and away from mangrove.	Most of the construction labours resides in the nearby villages where all basic facilities are easily available. However, for those residing near the construction site, infrastructure facilities such as water supply, fuel, sanitation, first aid, ambulance etc. are provided by APSEZ. Details were submitted as a part of compliance report submission for the period Apr'17 to Sep'17. Please refer general condition no. ii of the EC & CRZ clearance for further details.
✍ **Operation Phase:**		
1	Wastewater such as generated during cleaning of jetties, floor washing, domestic use etc. should be collected in a settling pond and released to marine environment only after ascertaining that it is free from oil and SS. The toilets on the jetties must have compact sewage treatment facilities.	Entire quantity of sewage generated from APSEZ premises is being treated in designated ETP / STP and treated sewage is used for Horticulture purposes. Please refer specific condition no. xii of the EC & CRZ clearance or further details.
2	Dust should be routinely monitored at the vantage points and corrective measures such as water sprinkling should be practiced if it increases beyond permissible limits.	Ambient Air Quality (twice in a week) monitoring is being carried out by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Adequate safeguard measures are being taken for abatement of dust emissions. Please refer specific condition no. xi of the

Sr. No.	Suggested Measures	Compliance Status
		EC & CRZ clearance or further details.
3	It should be ensured that the effluent released into the Gulf meets the prescribed GPCB criteria at all times.	Entire quantity of effluent / sewage generated from APSEZ premises is being treated in designated ETP / STP and treated water is being utilized on land for Horticulture purposes after compliance with GPCB standards. Please refer specific condition no. xii of the EC & CRZ clearance or further details.
4	Appropriate spill response scheme (Tier-1 to Tier-3) should be in place to minimize impacts on marine environment, should a spill occur.	Oil spill contingency plan is in place to handle Tier 1 level oil spills considering different accident scenarios, and the vulnerable areas are identified and mitigation plan is prepared. Oil spill contingency response plan updated on 01.10.2020 is in place and implemented.
5	MPSEZL should commit mangrove restoration programme through afforestation in a defined time frame over larger and promising areas and should monitored periodically and protect from anthropogenic pressures.	APSEZ has carried out mangrove afforestation in 2890 ha. area across the coast of Gujarat. Please refer specific condition no. i & vii of the EC & CRZ clearance or further details.
6	A comprehensive marine quality monitoring programme with periodic investigations at predetermined locations should be undertaken by a specialized agency.	Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Please refer specific condition no. ix of the EC & CRZ clearance or further details.
7	The dust and noise levels at pre-decided locations including the jetty sites should be periodically monitored and remedial action taken if the levels exceed the prescribed norms.	Ambient Air Quality (twice in a week) and Noise (once in a month) monitoring are being carried out by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Please refer specific condition no. xi of the EC & CRZ clearance or further details.
8	MPSEZL should establish an Environment Management Cell (EMC) directly under the control of the Chief Executive.	M/s APSEZL has a well-structured Environment Management Cell, staffed with qualified manpower for implementation of the Environment Management Plan at site. Site team report to Sr. Manager (Environment) at Corporate, who heads the Environment Management Cell who directly reports to

Sr. No.	Suggested Measures	Compliance Status
		the top management. Environment Management Cell Organogram is attached as **Annexure – 16**.

Annexure – 13

ON SITE EMERGENCY PLAN

JULY 2021

PRODUCER

ADANI PORTS AND SEZ LTD

P.O Box No: 1, Mundra - 370421
(KUTCHH)

:: COMPILED BY ::

M.J.PATEL & ASSOCIATES

HAPPY ASSOCIATES
DISH approved Comp.Persons & Safety Proffessionals

6-A, NEW RANGSAGAR SOCIETY, NEAR GOVT. TUBE WELL, BOPAL, AHMEDABAD - 380058, MOB: 9825060783

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PREFACE

Adani Port Mundra is the seamless integration of 3 verticals consisting of Ports, Logistics and Special Economic Zone. APSEZ Mundra with the flagship port in the Gulf of Kachchh, is India's largest commercial port. Adani Port handles a wide variety of cargo ranging from coal, crude, containers to fertilizers, agri products, steel & project cargo, edible oil, chemicals, automobiles etc. A corporate agenda for APSEZ is to deliver overarching principle of tipple bottom-line. Adani Ports is striving to become Green Port by managing port operations and services responsibly, creating safe, secure and eco-friendly working environment.

Adani Port - Mundra has infrastructure to handle containers pan-India. We have container terminals operational. Deep draft berth facilitate berthing of largest container vessels arriving at the ports and best-in-class infrastructure ensures world class productivity, fast turnaround of vessels and efficient evacuation of containers from the port.

The Port operates two Single Point Mooring (SPM) facilities to evacuate imported crude oil. These SPMs can handle Very Large Crude Carriers (VLCC) and Ultra Large Crude Carriers (ULCC) up to 360,000 DWT. The crude is transported to refineries in North India through cross country pipeline network.

Adani Port - Mundra has capabilities and infrastructure to handle liquid cargo at Mundra. Multiple berths are equipped with different types & sizes of pipelines from jetty to tank farm to ensure safe and efficient handling of liquid products in big parcels. The tank farms can store multiple types of liquid cargo including vegetable oil, chemicals & petroleum, oil & lubricants (POL) products. The infrastructure at the Liquid terminal ensures best in class storage, safe and contamination free handling of liquid cargo.

Adani Port - Mundra is equipped with adequate infrastructure to handle coal. **Adani Port** handle all types and grades of coal including steam coal, imported coking coal & thermal coal, sourced from domestic sources. It has installed high speed ship unloaders / mobile harbour cranes for faster discharge of coal cargo and mechanized storage yards & integrated conveyor system to handle huge volumes of coal cargo.

Adani Port - Mundra is well equipped to handle minerals. Minerals & related cargo including Bauxite, Bentonite, Cement, Clay, Industrial salt, Iron ore fines, Rock phosphate and Gypsum, amongst others are handled here. Dedicated infrastructure, including specially demarcated concrete storage yards ensure zero ground loss. All necessary measures, with regards to equipment & storage are taken to ensure that there is no cargo loss or contamination.

Adani Port - Mundra has excellent capabilities to handle agri- cargo. Agri-commodities handled at the port include Yellow Peas, Chick Peas, Sugar, Wheat, de-oiled cakes, Barley, Sorghums, Maize & Rice, among others. Stringent standards concerning handling of Agri-products are followed at the port. Separate dedicated berths and specialized facilities ensure clean and contamination free handling of Agri-cargo along with abundant storage facilities and labour. Rail connectivity ensures that imported Agri-cargo is transported to distant areas within the country.

Adani Port - Mundra has capabilities and infrastructure to handle fertilizers. The fertilizers handled here include all types and grades including Granular Urea, Prilled Urea, DAP, DAP Lite, MOP Red, MOP White, NP, NPK etc. The Port team understands the delicate nature of fertilizer cargo and therefore employs the best method to handle fertilizer cargo, even during the peak season, ensuring full customer satisfaction. Dedicated berths, dedicated fleets of equipments, abundant covered storage facilities and adequate labour are available for handling fertilizer cargo at Mundra has state-of-the-art dedicated mechanized infrastructure for handling fertilizer cargo which is capable of loading ten rakes daily.

Adani Port - Mundra can capably handle all types & grades of steel cargo including Plates, Beams, Coils, Pipes, Slabs, Bars, Billets & over dimension Steel Plates / Beams or Pipes, amongst others, requiring specialized operations. The Mundra port has state-of-the-art technology Goliath cranes attached with vacuum lifters for scratch free handling of quality sensitive cargo and a best-in-class steel yard spread across 1.5 lacs sq. mtrs to handle 6 MMT/ year.

Adani Port - Mundra has the requisite infrastructure to handle project cargo. We are specialized in handling over-sized and overweight project cargo. The port has loaded / discharged, heavy/oversized machinery / equipment like Boilers, Rail Wagons (of Delhi metro), Heavy Transformers, complete Windmills and Heavy Machineries.

Adani Port - Mundra has the perfect infrastructure to handle timber. The port handles timber logs of different kinds for different customers. It has earmarked a storage area capable of 350,000MT timber storage.

Mundra port established the RoRo terminal in 2009 and since then has been serving as a gateway port for automobile companies situated in Delhi NCR, Rajasthan and Gujarat region. Mundra port handles exports of Cars, Buses, and Trucks.

Adani Port - Mundra is committed to uphold high standards of health and safety practices far beyond satisfying legal or regulatory requirements & promoting a culture seeking continuous improvement in the Health & Safety performance of the organization.

In view of presence of various materials handled, hazardous nature of liquids, due to situation of the port, various types of hazards exist in handling, storage and logistic activities. Hence, it is desirable and also statutory to prepare an emergency action plan for any emergency which may affect plant personnel, property as well as neighbouring areas and population.

Therefore, we have prepared this book which incorporates all required matters along with on site emergency plan. Our safety policy dictates that we will take all precautions and preventive steps to see that our workers carry out their job in a safe and healthy working condition. We have taken reasonably practicable preventive measures to avoid any accident. Necessary testing, checking, inspections, maintenance are carried out regularly.

It is also obvious that systematic and methodical action in any emergency would reduce and mitigate risk to life, property not only of the port but also of the surrounding area and environment. This on site emergency plan is prepared to carryout a systematic and methodical action in the event of any emergency. It gives different pre-emergency, emergency time and post emergency actions to be taken in a planned way. Such actions would go a long way in preventing or mitigating risk to life, environmental and property in emergency.

We are responsible to carryout planning and do everything reasonably practicable to comply with requirements of this plan and revise and amend from our experience. This plan will also be circulated to all senior personnel for their knowledge, information and subsequent action.

For **ADANI PORT & SEZ LTD.** MUNDRA

(Auth.Sign)

(This emergency action plan has been prepared for **Adani Port, Mundra** as per the guidelines laid down by the office of Director, Industrial Safety & Health. The source of data regarding Gas Dispersion and other information is based upon the book of Major Hazard Control – published by International Labour Organization).

CHAPTER–1

PRELIMINARY

CONTENTS

1.0 INTRODUCTION OF THE PLAN

Today in this world many kind of chemicals, oils, minerals & materials are handled & transported in enormous quantities, probably beyond safe manageable levels and that too in many cases with record speed. People working in ports & industries, storing, handling, transporting and using various chemicals & other material are constantly exposed to hazards like fire, explosion, toxic gas releases, spillage of dangerous substances, exposure etc. Disaster means accidents causing catastrophic situation, in which day to-day pattern of life is in many instances, suddenly disrupted and people are plunged into helplessness and suffering, as a result need protection, clothing, shelter, medical and social care and other necessities of life. Disaster may occur by natural phenomena, by man or by mans impact upon the environment.

This emergency action plan has been prepared based upon the specific needs of the site for dealing with those emergencies which, it is foreseen, may still arise despite taking of all reasonably practicable precautions. An emergency element of the plan must be the provision to attempt to make safe the port. Emergency incidents considered are ranging from small event which can be dealt with by port personnel, without the help of outside services to the worst event which involves outside public, emergency services agencies etc. This plan is in two sections, the first section explains basic requirements as below:

A – Definitions
B – Objectives
C – Hazard identification
D – Risk analysis and environmental impact
E – Organizational set-up
F – Communication system
G – Action on-site
H – Off-site emergency plan
I – Training, rehearsal and record aspect

The second section is annexure section. This 33 number annexure are designed to give specific information required during emergency. A considerable time can be saved due to handy information at the time of emergency. This information can also be helpful to the government in preparing district contingency plan.

1.1 IDENTIFICATION OF THE FACTORY

Adani Port at Mundra consisting of Ports, Logistics and Special Economic Zone. APSEZ handles a wide variety of cargo ranging from coal, crude, containers to fertilizers, agri products, steel & project cargo, edible oil, chemicals, automobiles etc.

Adani Port near mundra is 7 Kms from the town of Mundra which is about 9 km from the Gulf of Kachchh, the ancient Mundra Town is the headquarter of the Mundra Taluka, about 70 km away form the Dist. Headquarter of Bhuj, Dist. Kachchh. Mundra is directly linked to the National Highway NH-8A (ext.), State Highway SH-6 and SH-48. Gandhidham railway station is the nearest passenger rail head 50 km away. Mandavi airstrip (about 30 km), Kandla airstrip (about 45 km) and Bhuj Airport (about 70 km) are the airstrips/airports in the vicinity. Mundra was a small town with agriculture and minor commerce dominating its socio-economic character about a decade back. Mundra was devastated like other towns and villages in the earthquake that struck Kuchchh on January 26, 2001. With the reconstructive spirit of the people and economic incentive packages given by the Govt. of Gujarat as well as Govt. of India for the Kachchh distt., Mundra is now witnessing a spate of industrial activity. The industrial and entrepreneurial potential of the town started unfolding with the Adani Group setting up its Port on the Mundra sea front in 1998.

IDENTIFICATION

Port Commissioned :	1998
Port & APSEZ area:	Mundra SEZ - 18000 ha, Notified SEZ area 8481.2784 ha.
Village :	Mundra
Nearest City:	Bhuj
Nearest Railway station	Bhuj, 6 0 Km
Nearest Airport	APSEZ Private Airstrip

SITE LOCATION		
State		Gujarat State
Nearest Important Town & Distance		Mundra – 10 Kms
Nearest Railway Station & Distance		Gandhidham – 50 Kms
Nearest Port & Distance		Kandla Port Trust - 60 Kms
Nearest Airport & Distance		Mandavi airstrip (about 30 km), Kandla airstrip (about 45 km) and Bhuj Airport (about 70 km) are the airstrips/airports in the vicinity
Nearest Highway Milestone & Distance		National Highway 8A Extn. & State Highways 6 & 48.
Approach Road		4-Lane Rail-over-Bridge to ensure that two modes of transportation i.e. road & rail, do not impede each other‘s movement.
GEOGRAPHICAL DATA		
Height above mean sea level		14 meter
Site characteristics (Terrain Type)		Coastal Area
Location of APSEZ		Geographically, located between 22°.4451.73 North latitude and 69°.41.41.60 East Latitude
Seismic Zone		Zone 5, as per IS : 1893 -2002
METEOROLOGICAL DATA		
Climate of Area		Dry, Arid Coastal Climate
Highest Daily maximum Temperature		46.1 °C
Max. dry & wet bulb temperature		37.7 / 26.8 °C
Wind Regime		Summer - SW & W, Monsoon - SW, Winters - N, NW
Annual Rainfall		268.5 mm
Visibility		Good through out of the year
Relative Humidity %		
	Max	80
	Min	22
Wind Velocity Average		32.4 km/hr study period (Dec-05 to Feb 06).

Wind Velocity	Max	90 Km/ hr
Wind velocity during monsoon		50 KM/hr
WATER SUPPLY		
Source of Water		Well nearby area.

Adani Port - Mundra is committed to uphold high standards of health and safety practices far beyond satisfying legal or regulatory requirements & promoting a culture seeking continuous improvement in the Health & Safety performance of the organization.

Annexure – 1 attached in the report gives remaining detail of the port such as name of the occupier, manager, with their residence address and telephone numbers. Persons to be contacted in respective shifts etc. is mentioned. We have for our all the activities made the identification of hazards and relevant actions are taken as stated in Chapter – 2 of this plan.

1.2 MAP OF THE AREA

A map of the surrounding area of our Port & SEZ is enclosed marked as Annexure – 2, showing following locations of port such as:

- **A.** Exact location of the Port & SEZ
- **B.** Surrounding area
- **C.** Approach roads
- **D.** Off site emergency services
- **E.** Company owned Fire Station, Police Station
- **F.** North direction

This map is useful to know the surrounding area, location of above facilities in advance and identify the area which could be affected due to an emergency, if turned into off-site emergency and if evacuation of workers and others is necessary. Another map is attached marked as **Annexure – 3, Factory layout** showing all vital detail of the unit such as (1) Hazardous storage & process area (2) Other Process Plants Departments & Machines (3) Location of Assembly points (4) location of Emergency Control Centre (5) location of fire fighting equipments, entry, exit gates etc.

1.3 IMPORTANT DEFINITIONS

All important definitions stated in the guidelines by DISH, are adhered to in preparation of this plan. These definitions are accepted by all the concerned government, semi-government bodies and institutions as mentioned relevant to the emergency planning.

1.4 ABOUT OBJECTIVES OF THE EMERGENCY PLAN

An emergency can not always be prevented but controlled within limits and its effects minimized by using the best available resources at the time. Emergency planning is a management function and it should not be considered in isolation. Management should evaluate the activities, operations and process carried out within the works before starting to plan an emergency operation.

A check must be made to ensure that all required steps have already been taken are included in emergency planning. Considering the number of employees, material and process, availability of resources, location of site, size and complexity of the works, we have prepared this plan. In this plan, we have given clear instructions without overlap or confusion for all concerned staff members. The same details are prepared as per annexures.

In spite of various preventive and precautionary measures taken in the plant, the possibility of a mishap cannot be totally ruled out. Hence, the need to prepare a Contingency Plan for dealing with incidences which may still occur and are likely to affect LIFE and PROPERTY both within the plant and in the immediate neighborhood.

Such an emergency could be the result of malfunction of the Plant & Equipment or non-observance of operating instructions. It could, at times, be the consequence of acts outside the control of plant management like severe storm, flooding, or deliberate acts of arson or sabotage.

OBJECTIVES OF THE PLAN

1. To control the emergency, localize it and if possible eliminate it.
2. To avoid confusion, panic and to handle the emergency with clear cut actions.
3. To minimize loss of life and property to the plant as well as to the neighborhood.
4. To make head count and carry out rescue operations.
5. To treat the injured persons.
6. To preserve records and to take steps to prevent recurrence.

7. To restore normalcy.

The **On site Emergency Plan (OEP)** explains the code of conduct of all personnel in the plant along with the actions to be carried out in the event of an Emergency. This plan gives the guidelines for employees, contractors, transporters, etc. It not only defines responsibilities but also inform about prompt rescue operations, evacuations, rehabilitation, co-ordination and communication.

EMERGENCY

An emergency is a situation which may lead to or cause large scale damage or destruction of life, property or environment within or out side the factory. Such an unexpected situation may be too difficult to handle for the normal work-force within the plant.

NATURE OF EMERGENCY

The emergency specified in the OEP refers to the occurrence of one or more of the following events:

1. Fire/Explosion
2. Major accident such as structural or building collapse, overturning of road tanker containing chemicals.
3. Natural calamities like storm, flood, earth quake, etc.
4. Sabotage act of terrorism, civil commotion, air raid etc.

On Site Emergency Plan (ONLY PORT AREA)
Adani Ports and Special Economic Zone Limited
Code for Declaration of Emergency
Siren for one minute followed by 5 sec gap repeated four times.
Code for Declaration of All Clear
Continuous siren for two minute
Schedule of Siren Testing
4th and 19th Every Month – 1000 hours (Port) & 1100 hours (West Basin)

CONTACT IN EMERGENCY (Intercom Numbers):

FIRE – 52400 [MPT], 52985 [WB] QHSE – 52778 [MPT], 52974 [WB]

SECURITY – 52300 [MPT], 52900 [WB] OHC – 52444 [MPT], 52984 [WB]

ISCR – 52100 [MPT]POC [MPT] – 52442, 52762 [MPT] CCR [WB] – 52934

CONTACT IN EMERGENCY (Landline Numbers): STD CODE – 02838

FIRE – 289101 [MPT], 255985 [WB] QHSE – 255778[MPT], 255974 [WB]

SECURITY –289322 [MPT], 255900 [WB] OHC – (02838) 289267 [MPT], 255984 [WB]

POC [MPT] – 289371 / 72 CCR WB – 255934

CHAPTER NO. II

INTRODUCTION OF RISK AND ENVIRONMENTAL IMPACT ASSESSMENT

CONTENTS

2.00 INTRODUCTION OF RISK & ENVIRONMENTAL IMPACT ASSESSMENT

In this chapter all vital information such as Port installations, machinery, quantum of substance stored – Its storage and handling, loading-unloading practices, Its potential to damage the work place, its potential to create an emergency, its potential to damage the environment and life, nature of process carried out, types of emergency likely to take place, provisions to control such emergencies, are given. Hazard identification is made based upon handling of various substances and relevant steps to avoid probable hazards.

2.01 FACTORY LAYOUT

Layout of the port is enclosed as annexure-3, which shows following important locations for emergency planning.

1. Main approach to the port & main gate
2. Liquid Terminal having 97 tanks for storage of different liquid commodities
3. Closed godowns
4. Open storage yards
5. Fertilizer Cargo Complex
6. Steel Yard for handling steel cargo
7. The SPM facility
8. Berths & Jetty for Liquid cargo
9. Docks alongside its berths for handling dry bulk & break bulk cargo
10. Security Cabin / Exit & Entrance routes
11. The container terminals having a combined infrastructure consisting of 2.1 km of quay length
12. Admin buildings, canteens
13. Control buildings,
14. Other various building consists of offices
15. Fire stations,
16. Medical centers & occupational health centers
17. Internal Roads & railway line

The Port layout plan is kept in the Emergency Control Center (ECC) so that proper and immediate actions can be taken by the concerned personnel.

2.02 IDENTIFICATION OF HAZARDS IN STORAGE & CONTROL MEASURES

In **ADANI PORT - Mundra**, huge quantities of dangerous chemicals are handled and kept for intermediate temporary storage in liquid terminal for further transport. By its nature, in which dangerous chemicals are handled (storage/transportation) carries the probability of an accident and gives rise to the laying out of different accident scenarios.

In addition to observe safe standards for the operation of Port, close attention shall be paid to overall site security arrangements. Highly flammable Substances such as : High Speed Diesel, Vinyl Acetate Monomer, Furnace Oil, Naphtha, De-natured Ethyl Alcohol, Methanol, Low Aromatic White Spirit are stored in giant capacity tanks. Besides above some intermediate compounds & chemicals such has Linear Alkyl Benzene, Acetic Acid, Acetic Anhydride are stored. Other than above chemicals some mineral oils & other oil compounds such as Mineral Turpentine Oil, Alpha Plus, CBFS, Crude Soyabean Oil are stored. All above are very hazardous substances, even while handling in small quantity, safety should be the prime consideration.

As fire is likely in the case of Methanol, Naphtha, VAM, solvents & HSD due to leakage, ignition, spark, vapour dispersal, materials are kept isolated from any source of fire-ignition. Bonding, Earthing & grounding to all pipes, joints, tanks to mitigate static charges. Their handling is strictly monitored.

Hazardous Chemical	Storage · Location	Major hazards	Physical Form	Maximum Quantity Stored Onsite kl
Motor spirit	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	15042
Naphtha	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	2944
Gasoil	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	461122

Methanol	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	18000
Toluene	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	3000
Acetic acid	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	2960
P- Xylene	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	6460
Vinyl Acetate Monomer	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion, toxic gas	Liquid	1458

In addition of above raw materials, there are various open & closed godowns, scattered fuel storages for D.G.Sets, Coal Yards.

In spite of all controlling measures, accident can happen due to dangerous physical properties of above substances – Risk of fire, leak of chemical and subsequent toxic atmosphere**.** Although, the port operations are running since quite a long time without any incidence of fire or leak due to sound handling practices & laid down safety systems.

In Port Operations it is likely that some of the accidents occur due to all following mentioned reasons ::

- **Falls from height** :: can occur whilst carrying out trimming, sheeting and container lashing, securing loads, accessing ships, working on board a ship or working on heavy machinery.

- **Falling Objects** :: Whilst carrying out loading and unloading operations and stacking and stowing goods there is a risk of falling objects. Items may be loose and incorrectly or poorly slung or stacked. Fittings and fixtures used during lashing operations may be dropped. Loads or objects may collapse or fall having become unstable during transport or having been poorly loaded.

- **Fatigue**:: Dock operations can be prone to unexpected events and delays over which there may be little control. Fatigue can develop slowly and will not always be obvious. It can increase the risk of accidents through poor perception or physical exhaustion.

- **Mooring Hazards** :: Mooring can be a hazardous activity as there is a risk of a person getting caught in a line or a winch. The lines can be very heavy and awkward, particularly if they are wet, and may break and snap back.

- **Lifting Equipments** :: Container Lifting & material loading/unloading are very much dependent on lifting equipments. If proper inspection, maintenance is not followed, these operations may cause severe accidents.

- **Fire/Electrocution ::** All electrical equipment and installations if not designed, constructed, installed, maintained, protected and used properly, it can lead to fire, electrocution accidents.

- **Hazardous or Asphyxiate Substances** :: Workers loading and unloading solid bulk cargoes may be exposed to dust or respiratory sensitizers that can cause asthma. Cargoes may be flammable, toxic, poisonous or corrosive. Some cargoes, for example grain, may have been fumigated. Some solid bulk cargoes in the hold may not be hazardous themselves, for example fishmeal or bark, but may produce gases due to decomposition or bacterial action. Vehicle exhaust emissions in the ship‘s hold may also give rise to hazardous fumes.

- **Moving Vehicles and Equipment** ::An appropriate traffic management system must be in place and will aid both safety and operational control of the port.

- **Night Work** ::Night work/shift work can contribute to or produce negative biological effects (heart and stomach disorders), psychosocial effects (fatigue, increased accidents, stress) and individual effects (disrupted family life, isolation, stress).

- **Noise**:: Equipment and engines may produce noise which is augmented when they are operated in a ship‘s hold or a warehouse. As a rule of thumb you may be at risk if you have to shout to be clearly heard by someone 2 metres away, if your ears are still ringing after leaving the workplace or if there are noises due to impacts such as those caused by hammering.

- **Slips and Trips** ::The majority of dock accidents reported to the HSA are due to slips, trips and falls on the same level.

- **Tidal and Environmental Hazards** :: The weather can have an adverse effect on port and dock operations and can reduce visibility. Cold and wet weather can reduce concentration and make manual work more difficult. Hot weather may result in heat exhaustion, sunburn or sunstroke. Wind, ice and fog can all increase the risk of slips, trips and falls. Tidal movements can affect access and egress to the ships, cause difficulties during loading operations and result in collisions between dockside equipment and a ship.

- **Severe weather and other natural hazards**
  - ✓ Ports may suffer from a variety of natural events. These include:
  - ✓ High winds and severe storms;
  - ✓ Flooding from tides, river water, land water or a combination of both;
  - ✓ Temperature extremes;
  - ✓ Earthquakes;

The ports regularly operate in temperatures over 40°C. Exposure to extremely high is likely to affect the ability of port workers to continue to work safely and without endangering their health. At this Mundra port, large cargo of dangerous chemicals (toxic or flammable) are unloaded from the ships and stored in liquid terminal. Unloaded dangerous chemicals are transferred to the storage tanks through the pipelines. Storage tanks are provided to store finished products which receive from the ship prior to transfer to consumer end for their processing. Huge quantities of dangerous chemicals are handled and kept for intermediate temporary storage in liquid terminal for further transport. Petroleum products, hazardous chemicals are transported to consumer by rail wagons, road tankers and cross country pipelines. The industrial and commercial activities in the area heavily pollute the environment.

2.03 IDENTIFICATION OF HAZARDS IN STORAGE / PROCESS & CONTROL MEASURES.

FIRE HAZARD

- ❖ Flammable substances are stored and handled in large quantity.
- ❖ Static electricity due to weak/loose earthing
- ❖ Slight – intermittent or steady leak causing flammable vapour cloud and any stray ignition.
- ❖ Accidental fire in Combustible materials godowns

TOXIC HAZARD

- Due to toxic physical properties of chemicals handled
- All above mentioned chemicals are stored and used in relatively sound quantity in storage tank. Transferred mechanically.
- There are chances of corrosion of pipes, tanks, receiver tanks due to materials as also external corrosive atmosphere.
- Leakage of toxic-corrosive substance in large amount – dispersion of toxic – corrosive chemical vapour - mist in the surrounding area of the unit.
- Splash of chemical and/OR its exposure to any working person due to mishandling or by accident

EXPLOSION HAZARD

- Sudden outburst of fire, heat or steam, finding inadequate or no escape may cause bursting or explosion.
- Other Pressure equipments (pneumatic operations, utilities, air receivers containing compressed air & gas in utility may cause such a situation

2.4 PROCESS DESCRIPTION

A port is a facility at the edge of an ocean, for receiving ships and transferring cargo to and from them. The term seaport is used for ports that handle ocean-going vessels Ports have specially-designed equipment to help in the loading and unloading of vessels. In fact, it can be stated that a port is an intermodal node where goods are loaded/unloaded to/from vessels and sent to their destination, be it onshore or offshore.

A port system could be thought of as a complex, often huge, environment where several transport operations are carried out, including. not only maritime transport, but also unloading and, of course, storage of goods, along with typical process activities. Ports are normally located near a city, unless they are isolated terminals serving a process plant or a pipeline. Many cities have in fact been founded and have grown around spots that offered shelter for fishing boats, and later, with the growth of commerce and sea-exploration, have become port-cities Transport includes ships and barges as well as Lorries, trains, and pipelines. Process operations embrace mainly storage, which can be of different types: solid bulks in silos, stacks, warehouses, packages; liquid bulks in tanks; containerized goods of any kind. Bulk carriers, used to transport bulk solids such as (iron) ore, coal, coke, bauxite/alumina, food staples (rice, grain, etc.), cement, sugar,

quartz, phosphate rock, fertilizers, sulphur, scrap, and similar cargo. They can be recognized by the large box-like hatches on their deck, designed to slide outboard for loading. Bulk carrier's discharge at terminals provided with proper cranes; ore and coal can be stored in heaps. Tankers are usually large ships which carries petroleum products or chemicals in bulk. Apart from pipeline transport, tankers are the only method of transporting large quantities of vegetable oils around the world . Among the chemicals transported by sea, the most important are methanol, ethanol, toluene, acetic acid, caustic soda lye, naphtha, gasoil, motor spirit etc. Land transport activities, which are carried out by lorry, train and pipelines. - Storage, warehouses, container terminals, car parks, bulk solid wharves, etc. Chemical releases from tank farms on site are the most probable. It includes highly flammable and toxic chemicals. The latter is at approximately atmospheric pressure so that even a catastrophic failure should not result in the formation of a large flammable vapor cloud . The causes for overpressure may be overheating due to a neighboring fire, overfilling or rollover. Overfilling is a common phenomenon in storage installations and has one of the highest probabilities of occurrence values. Another possibility is the liquid catching fire due to a local incident or operation, which may lead to stress rupture of the tanks. Severe mechanical damage may occur from impacts from projectiles from disintegration of nearby vessels, aircraft impacts or nearby railway accident due to derailment. The tank farm storing of non-boiling liquids can be affected by pool fires and unconfined vapor cloud explosions. These spills may also result in the direct formation of a flammable vapor cloud. The latent heat required for evaporation has to be provided by the surroundings and the ground. The rate of evaporation will be initially high but decreases rapidly as the available heat from the surroundings is exhausted.

Liquid Terminal ::

Liquid terminal comprises of tank farm area, pump house, and loading bays. Flammable Chemicals / petroleum products receive from the bulk ship carriers and transfer to intermediate storage tank for further distribution to the customer. Tank farm area comprises of finished petroleum products

2.5 OTHER HAZARDS AND CONTROLS

In the plant, in addition to the hazards from storage handling and usage of flammable substances and other substances, there are certain other hazards likely due to failure of machinery and equipments. Such hazards are listed below:

- Machineries and equipments failure
- Structural collapse
- Hazards during maintenance of plant

- Health hazards & Physical injuries
- Failure of electrical Installations
- Natural calamities (Earthquake, fall of lightening, floods, Tsunami, cyclones, storms) or manmade hazards. Causes of such other hazards, their effects on plant and the surrounding area, their preventive measures etc. are stated in ANNEXURE - 7

2.6 TRADE WASTE DISPOSAL

In Port Operations, no production activities are available. No hazardous trade waste is likely to generate in daily basis. Though effluent treatment plant has been provided for some of the identified waste.

In air pollution, the source of emission is from DG stack has been provided at sufficient height. Periodical monitoring of stack is done. Periodical Noise monitoring, ambient air monitoring are carried-out and records maintained.

We are having consolidated consent from the Gujarat Pollution Control Board : which is valid for 5 years. Other detail is furnished in Annexure – 8.

2.7 RECORD OF PAST INCIDENTS

So far, no incident has occurred in the past at our Port. However, due to port operations, handling of various hazardous chemicals at liquid terminals, container terminals & at various dry ports certain undesired situations have occurred at other ports in the world. Hence, from those incidents, we have already taken preventive steps, controlling measures. Regular checking, maintenance, tests are carried out to avoid any unwanted situations taking place.

2.8 GAS DISPERSION CONCENTRATION

Using Gaussian formula, as there are more chances of ground level release, assuming small leak rate to the worst event i.e. rupture of the tank and release, its down wind concentration is calculated at wind speed 2.0 M/second and Annexure – 10 is compiled. Subsequent to this, Evacuation Table, Annexure-11 is prepared to provide a quick guide to an On Site personnel to take proper actions. Moreover, such data are stated in Risk Assessment, but it is a crude approach and may not be fully appropriate for decision making as change of wind velocity and weather conditions may cause certain variations.

2.9 RISK ASSESSMENT

Identification of hazards constitutes the first step in the task of hazard analysis, which in turn produces a basis for risk assessment.

Points 2.2 to 2.7 give us the hazard identification in the unit. Probability of frequency of such hazards will give risks and analysis, how they could occur and estimation to the extent, magnitude and likelihood of any harmful effects or consequences will give risk analysis. Fire risk shall be calculated considering the worst event which can be used as guideline at the time of an emergency.

The main objective of the Risk Assessment (QRA) is to identify the potential hazardous scenarios and assess the impact of major accident hazards from the liquid terminal as well as from the tanker loading and ship unloading facilities on the Mundra port and property within and outside the battery limit of the facilities. The study was initiated by Mundra Port SEZ Pvt. Ltd to evaluate the potential hazardous situation in the liquid terminal, its consequences and impact over onsite and offsite areas, to investigate and determine the overall risks to health and safety arising from any possible major interactions between existing or proposed installation in the area, where the significant quantities of dangerous substances are stored, handled, and transported including the loading and unloading of such substance to and from vessels, to assess the risks. The Canvey reports were the first significant contribution to industrial port environment QRAs, and they are still relevant today however, it is an attempt at standardizing the process of risk assessment of navigation and unloading operations for a generic port terminal. The focus of entire study was on accidents where a serious loss of containment could result in production of large cloud of flammable or toxic substances. The general method adopted is described as follows: (Courtesy: **The QRA Report data taken from CHILWORTH Global**)

- To identify potentially hazardous materials and establish maximum total inventories and location. This information was gathered through conducting visits to each of the installation involved and holding discussions with site personnel
- To consider the behavior of the dangerous substances on release, on the basis of information on material properties and process/ storage conditions
- To identify ways in which serious losses of containment could occur, presenting a hazard to the local population
- To assess the level of risk and the probable impact to the surroundings for certain port areas
- To assess the probability and consequences of selected failure events Liquid terminal and jetty areas are required to produce a contingency plan for accidental marine hydrocarbon pollution, including a study of the effects of possible spills and of their evolution.

The QRA results are immense use in developing onsite offsite emergency plan. The study covers liquid terminals, pump house and loading bays. Accidents occurring during the (external) approach of the tankers to the port were not taken into account. Possible sabotage-related scenarios and accidents likely to occur during tanker maintenance operations were excluded from the analysis. Hazardous flammable chemicals, liquid hydrocarbons were considered for the study. Moreover, only bulk transportation and handlings are included within the scope of the study in Mundra port huge quantities of dangerous chemicals are handled and kept for intermediate temporary storage in liquid terminals for further transport. By its nature, in which dangerous chemicals are handled (storage/transportation) carries the probability of an accident and gives rise to the laying out of different accident scenarios. The industrial and commercial activities in the Mundra port area heavily pollute the environment. Some chemicals are present for years in these sites, due to enterprising problems. In general, many incidents have occurred in various chemical storage facilities during the past few years with considerable consequences to neighboring populations. The study team identified 49 numbers of Maximum Credible Loss Scenarios (MCLS), DNV- PHASTRISK software has been used for estimating the potential impact to surrounding environment. The types of accident that may take place in the Mundra port are: fire, explosion, release and dispersion of toxic gases/vapors or a combination of these. The thermal/toxic compound doses were first computed . The types of damage investigated were burns of various degrees, acute poisoning, or even death. The types of accident considered in the scenarios of this study are analyzed below

Jet fire:

When pressurized flammable liquids are released from storage tanks or pipelines, the materials discharging through the hole will form a gas jet that entrains and mixes with the ambient air. If the material encounters an ignition sources while it is in the flammable range, a jet fire may occur

Pool fire

The continuous release of a flammable liquid usually results in a pool fire. When the liquid is spilled in a confined space, the pool size is also confined and the amount of air that sustains the fire is limited, because the ventilation is controlled by the vent ducts In this case the type of the fire is characterized as 'confined'. When the liquid is spilled in an open area, it covers a large surface area and the amount of air is unlimited.

UCVE

Then the fire is referred to as 'unconfined' Unconfined Vapor Cloud Explosion (UVCE) This type of explosion takes place when a sufficient amount of flammable material (gas or liquid having high vapor pressure) is released and mixed with air to form a flammable cloud, such that the average concentration of the compound in the cloud is higher than the lower limit of explosion. The explosion occurs in an open space and the resulting overpressure affects humans and buildings through a blast wave covering large distances.

BLEVE

BLEVE (Boiling Liquid Expanding Vapor Explosion) is a phenomenon resulting from the failure of a vessel containing a liquid at a temperature significantly above its boiling point at normal atmospheric pressure. The main hazard posed by BLEVE of a container filled with a flammable volatile liquid is a fireball and the resulting radiation, due to instantaneous ignition of the flammable vapor cloud. Release and dispersion of toxic gases and vapors During the combustion of a flammable material a lot of chemical compounds are produced and travel large distances downwind, forming a combustion gas cloud. Some of them (CO, NOx) are toxic and even fatal to humans at sufficiently high doses. In this way the particles are carried away by these gases traveling some distance into the heavy gas cloud and affect inhabitants before they meet the ground

Consequence Analysis Results Summary

In general, it was observed that effect of catastrophic rupture of storage tank in enclosures extends beyond the tolerable range. It is also observed that in these enclosures, only full bore rupture of the pipe lines and catastrophic rupture of the storage tanks are of main concern for high risk. For the catastrophic failure of the storage tank, one of the main causes is escalation of minor events.

Jet fire : Jet fires can arise from gas, two-phase, or liquid releases. The worst-case jet fires are likely to be from the pump house and mainly from the maximum credible accident scenarios in the critical pipeline failure in pump house and tanker loading bays. The following jet fire results obtained from the DNV PHAST software are presented below:

Naphtha transfer pump discharge line rupture scenario which results into jet fire flame radiation intensity of 37.5 kW/m2 to the distance of 127 meter impinges directly to the adjacent pumps in the pump house and associated pipelines carrying hydrocarbons to the loading bays

Vinyl Acetate Monomer discharge line rupture scenario, which results into jet fire flame radiation intensity of 37.5 kW/m2 to the distance of 75 meters, impinges directly to pipelines carrying to the loading bays

Gasoil pump discharge line rupture scenario, which results into jet fire flame radiation intensity of 37.5 kW/m2 to the distance of 41 meters, impinges directly to pipelines carrying to the loading bays

Pool fire: Pool fires can arise from any site that handles liquid hydrocarbons. The worst case is likely to be in the tank farm . Mostly tank farm pool fire is contained within the tank bund itself. Oil spills on ground from the pipelines handling hydrocarbons may results into pool fire and may affect adjacent equipment resulting into domino effects (BLEVE).

Scenario No	MCLS	Radiation intensity kW/m^2	Distance, m
1	Catastrophic rupture of Naphtha storage tank T-01 (2944 kl)	12.5	214
10	Catastrophic rupture of storage tank P-Xylene T-39 (1460 kl)	37.5	408
13	Catastrophic rupture of Vinyl Acetate Monomer VAM storage tank T-24 (1458 kl)	37.5	285
16	Catastrophic rupture of methanol storage tank T-119 (5000 kl)	37.5	303
19	Catastrophic rupture of storage tank P-Xylene T-115 (5000 kl)	37.5	226
31	Loss of containment from P-Xylene tanker 30 MT	37.5	126
40	Loss of containment from P- Xylene tanker 20 MT	37.5	117
47	P-Xylene pump P-39 discharge line full bore rupture	37.5	117

Vapor cloud explosion:

In general catastrophic gas explosions happen when considerable quantities of flammable material are released and dispersed with air to form an explosive vapor cloud before ignition takes place. A vapor cloud explosion (VCE) occurs if a cloud of flammable gas burns sufficiently quickly to generate high overpressures. The following vapor cloud explosion results obtained from the DNV PHAST software are presented below:

Catastrophic failure of Naphtha storage tank T-01 is a worst case scenario, which results into dispersion of naphtha (flammable mixture) in the atmosphere; it may generate overpressure (0 .2608 bar) to the distance of 1235 meter and affecting the adjacent storage tanks as well as to the nearby enclosures

The following vapor cloud explosion results obtained from the DNV PHAST software in which overpressure blast waves affecting the adjacent storage tanks, as well as major impact to adjacent enclosures.

Scenario No	MCLS	Overpressure (bar)	Distance, m
7	Catastrophic rupture of methanol storage tank T-32 (1000 kl)	0.2068	124
10	Catastrophic rupture of storage tank P-Xylene T-39 (1460 kl)	0.2068	121
13	Catastrophic rupture of Vinyl Acetate Monomer VAM storage tank T-24 (1458 kl)	0.2068	433
16	Catastrophic rupture of methanol storage tank T-119 (5000 kl)	0.2068	257
19	Catastrophic rupture of storage tank P-Xylene T-115 (5000 kl)	0.2068	226
22	Catastrophic rupture of Toluene storage tank T-122 (3000 kl)	0.2068	465
31	Loss of containment from Naphtha tanker 30 MT	0.2068	147
37	Loss of containment from Naphtha tanker 20 MT	0.2068	126

46	Naphtha pump P- 01 discharge line full bore rupture	0.2068	257
48	Toluene pump P-122 discharge line full bore rupture	0.2068	93
49	VAM pump P-24 discharge line full bore rupture	0.2068	110

Toxic Gas Release :

In case of release of toxic gas, when a gas that is heavier than air is released, it initially behaves very differently from a neutrally buoyant gas. The heavy gas will first "slump," or sink, because it is heavier than the surrounding air. As the gas cloud moves downwind, gravity makes it spread; this can cause some of the vapor to travel upwind of its release point. Farther downwind, as the cloud becomes more diluted and its density approaches that of air, it begins behaving like a neutrally buoyant gas. This takes place when the concentration of heavy gas in the surrounding air drops below about 1 percent (1 0,000 parts per million). For many small releases, this will occur in the first few yards (meters). For large releases, this may happen much further downwind. A gas that has a molecular weight greater than that of air will form a heavy gas cloud if enough gas is released. Gases that are lighter than air at room temperature, but that are stored in a cryogenic (low temperature) state, can also form heavy gas clouds. Many substances that are gases under normal pressures and temperatures are stored under pressures high enough to liquefy them. When a tank rupture or broken valve causes a sudden pressure loss in a tank of liquefied gas, the liquid boils violently and the tank contents foam up, filling the tank with a mixture of gas and fine liquid droplets (called aerosol). Flash boiling is the term for that sudden vaporization of a liquid caused by a loss of pressure. When the liquid and gas phases of a chemical escape together from a ruptured tank, the release is called a two-phase flow. When a two-phase mixture escapes from storage, the release rate can be significantly greater than that for a release of pure gas. The two-phase mixture that escapes into the atmosphere may behave like a heavy gas cloud. The cloud is heavy in part because it is initially cold, and therefore denser than it would be at ambient temperatures, and also because it consists of a two-phase mixture. The tiny aerosol droplets mixed into the cloud act to weigh the cloud down and make it denser than a pure gas cloud, and their evaporation cools the cloud. Toxic materials that become airborne are carried by the wind and transported away from the spill site. While being transported downwind, the airborne chemical(s) mix with air and disperse. Gases and two-phase liquid-vapor mixtures are divided into three general classes:

- Positively buoyant
- Neutrally buoyant
- Negatively buoyant.

These classifications are based on the density difference between the released material and its surrounding medium (air). The classifications are influenced by release temperature, molecular weight, presence of aerosols, ambient temperature at release, and relative humidity.

Ignition Sources :

In order for a fire or explosion to start there must be an ignition source of sufficient heat intensity to cause an ignition. Ignition causes a release of flammable liquid or gas to become a fire Uet fire, flash fire, pool fire etc.) or explosion. There are many possible sources of ignition and those that are most likely will depend on the release scenario. Sources of ignition include electrical sparks, static electricity, naked flames, hot surfaces, impact, friction, etc. The following Ignition sources identified in a QRA under several categories including: **Hot Surfaces-** unlagged surfaces on hot equipment can act as sources of ignition; **Current Electricity-** electrical equipment and cables can act as sources of ignition if sparks are generated at contact points or where wires overheat; e.g. electrical equipment sparking **Static Electricity** - static electricity can build up on any unearthed equipment and generate sparks. Static is commonly found on vehicles, vessels handling particulate solids and manned areas with nonconductive floor or footwear unearthed floors; e.g. electrostatic discharges **Naked Flames** - all naked flames (including cigarettes) are potential sources Cofignition; this category also includes welding, flame-cutting and other hot work, fired furnaces and flares; e.g. Open flame heaters (boilers and flame heaters) **Friction** - equipment with moving parts in contact can generate heat through friction if not properly lubricated. This includes all rotating equipment and cold cutting devices such as drills, lathes and saws; Mechanical sparking **Impact** - impact between hard surfaces, particularly metal-to-metal contact, can generate sparks. This includes lifted objects lowered to a metal floor too quickly and the use of hand tools such as hammers; and **Chemical ignition-** some chemicals can spontaneously ignite if exposed to air, while oxidizing agents such as oxygen gas and peroxides can cause flammable materials to ignite at ambient temperatures.

Meteorology :

Atmospheric stability plays an important role in the dispersion of chemicals. Stability means, its ability to suppress existing turbulence or to resist vertical motion". Variations in thermal and mechanical turbulence and in wind speed are greatest in the atmospheric layer in contact with the surface. These turbulences have been influenced greatly by the air temperature and air temperature decreases with the height. The rate at which the temperature of air decreases with height is called Environment Lapse Rate (ELR). It will vary from time to time and from place to place. The atmosphere is said to be stable, neutral or unstable according to ELR less than, equal to or greater than Dry Adiabatic Lapse Rate (DALR), which is a constant value of 0.98° C per 100 meters.

Pasquill Stability Classes :

Pasquill has defined 6 stability classes.

A Extremely unstable.
B Moderately unstable
C Slightly unstable.
D Neutral
E Slightly stable.
F Moderately stable.

Three prime factors that defines Stability

1. Solar radiation
2. Night-time sky over
3. Surface wind

When the atmosphere is unstable and wind speeds are moderate or high or gusty, rapid dispersion of vapors will occur. Under these conditions, air concentrations will be moderate or low and the material will be dispersed rapidly. When the atmosphere is stable and wind speed is low, dispersion of material will be limited and air concentration will be high. Six stability classes from A-F are defined while wind speed can take any one of numerous values.

Results For Different Weather Conditions:

For the flammable and toxic releases which reaches off-site of the plant, calculations iterated with different weather conditions, since wind speed and stability have a great effect on cloud dispersion. Stable weather gives the greatest effect distances considered for the most stable weather conditions that occur at the site, as well as the most common weather conditions. The key meteorological data required for consequence modeling are wind and temperature. The wind speed and stability define the dispersion of a material, whilst the temperature defines the evaporation rate. The data utilized here for the base case QRA model were a temperature of 35°C.

Ambient temperature:

Maximum	Normal/average	Minimum
43 deg C	28 deg C *I* 30 deg C	17 deg C

Relative humidity%: 65% to 90%

CLIMATOLOGICAL TABLE:

S.No	Month	Maximum wind speed (kmph)	Average wind speed
1.	January	18	3
2.	February	20	5
3.	March	24	6
4.	April	22	7
5.	May	20	1
6.	June	24	1
7.	July	18	8
8.	August	67	7
9.	September	17	5
10.	October	18	3
11.	November	13	2
12.	December	18	2

These wind speed and stability class are used in consequence modeling:

Stability class	**F**	**D**	**C/D**	**C/D**
Wind speed m/s	2	3	5	9

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
1.	Catastrophic rupture of Naphtha storage tank T-01 (2944 kl)	UFL	264	223	189	0.02068	2380	2004	1803
		LFL	757	617	549	0.1379	1312	1045	896
		LFL-50%	1001	837	785	0.2068	1235	980	844
2.	Major leak (25 mm) in Naphtha storage tank T-01 (2944 kl)	UFL	8.48	8.38	8.07	0.02068	182	156	134
		LFL	57.79	50.84	40.7	0.1379	99	92	79
		LFL-50%	75	71	60	0.2068	92	87	74
3.	Minor leak (10 mm) in Naphtha storage tank T-01 (2944 kl)	UFL	4.57	4.34	3.62	0.02068	73	63	46
		LFL	28	21	12	0.1379	41	38	26
		LFL-50%	39	33	26	0.2068	38	36	25
4.	Catastrophic rupture of Acetic acid storage tank T-40 (2960 kl)	UFL	6.88	6.88	6.88	0.02068	NH	NH	NH
		LFL	6.9	6.9	7.57	0.1379	NH	NH	NH
		LFL-50%	15.6	15.7	18.2	0.2068	NH	NH	NH
5.	Major leak (25 mm) in Acetic acid storage tank T-40 (2960 kl)	UFL	5.46	5.45	5.39	0.02068	-	-	-
		LFL	5.53	5.53	5.52	0.1379	-	-	-
		LFL-50%	5.55	5.56	5.55	0.2068	-	-	-

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
6.	Minor leak (10 mm) in acetic acid storage tank T-40 (2960 kl)	UFL	3.43	3.27	3.03	0.02068	-	-	-
		LFL	4.10	4.06	3.96	0.1379	-	-	-
		LFL-50%	4.27	4.26	4.22	0.2068	-	-	-
7.	Catastrophic rupture of methanol storage tank T-32 (1000 kl)	UFL	28	28	30	0.02068	459	448	453
		LFL	44	36	47	0.1379	148	140	146
		LFL-50%	130	62	90	0.2068	124	117	122
8.	Major leak (25 mm) in methanol storage tank T-32 (1000 kl)	UFL	0.24	0.23	0.28	0.02068	-	36	-
		LFL	3.46	3.18	3.03	0.1379	-	16	-
		LFL-50%	9.85	10.16	7.88	0.2068	-	15	-
9.	Minor leak (10 mm) in methanol storage tank T-32 (1000 kl)	UFL	0.13	0.09	0.11	0.02068	-	-	-
		LFL	1.38	1.27	1.25	0.1379	-	-	-
		LFL-50%	3.27	3.38	2.83	0.2068	-	-	-
10.	Catastrophic rupture of storage tank P-Xylene T-39 (1460 kl)	UFL	29	29	31	0.02068	272	268	263
		LFL	52	49	48	0.1379	130	118	112
		LFL-50%	118	110	113	0.2068	121	111	106
11.	Major leak(25 mm) in P-Xylene storage tank T-39 (1460kl)	UFL	4.91	4.95	4.86	0.02068	-	-	-
		LFL	4.94	5.04	4.93	0.1379	-	-	-

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
		LFL-50%	5.21	5.05	4.94	0.2068	-	-	-
12.	Minor leak (10 mm) in P-xylene storage tank T-39 (1460 kl)	UFL	3.35	3.39	3.08	0.02068	-	-	-
		LFL	3.51	3.97	4.04	0.1379	-	-	-
		LFL-50%	3.53	4.02	4.09	0.2068	-	-	-
13.	Catastrophic rupture of Vinyl Acetate Monomer VAM storage tank T-24 (1458 kl)	UFL	33	33	36	0.02068	898	828	802
		LFL	240	212	195	0.1379	463	400	364
		LFL-50%	347	307	295	0.2068	433	372	337
14.	Major leak (25 mm) in storage tank Vinyl Acetate Monomer VAM T-24(1458 kl)	UFL	4.77	4.68	4.71	0.02068	32	21	23
		LFL	9.23	7.45	5.53	0.1379	23	13	13
		LFL-50%	23.8	19.5	15.03	0.2068	22	12	12
15.	Minor leak (10 mm) in storage tank Vinyl Acetate Monomer (VAM) T-24 (1458 kl)	UFL	3.11	2.92	2.69	0.02068	-	-	-
		LFL	4.29	3.94	4.21	0.1379	-	-	-
		LFL-50%	11.8	6.91	4.67	0.2068	-	-	-
16.	Catastrophic rupture of methanol storage tank T-119 (5000 kl)	UFL	80	75	88	0.02068	857	857	937
		LFL	83	78	97	0.1379	290	284	309
		LFL-50%	153	145	261	0.2068	247	240	259

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
17.	Major leak (25 mm) in methanol storage tank T-119 (5000 kl)	UFL	6.07	5.56	4.91	0.02068	-	-	-
		LFL	6.93	7.06	6.95	0.1379	-	-	-
		LFL-50%	9.35	8.20	7.03	0.2068	-	-	-
18.	Minor leak (10 mm) in Methanol storage tank T-119 (5000 kl)	UFL	2.56	2.47	2.36	0.02068	-	-	-
		LFL	4.81	4.78	4.89	0.1379	-	-	-
		LFL-50%	5.32	5.08	5.14	0.2068	-	-	-
19.	Catastrophic rupture of storage tank P-Xylene T-115 (5000 kl)	UFL	57	55	59	0.02068	531	521	575
		LFL	101	87	107	0.1379	232	204	231
		LFL-50%	252	217	224	0.2068	225	193	226
20.	Major leak (25 mm) in P-xylene storage tank T-115 (5000 kl)	UFL	6.31	6.30	6.34	0.02068	-	-	-
		LFL	6.39	6.38	6.58	0.1379	-	-	-
		LFL-50%	6.40	6.40	6.61	0.2068	-	-	-
21.	Minor leak (10 mm) in P-Xylene storage tank T-115 (5000 kl)	UFL	3.7	4.02	3.58	0.02068	-	-	-
		LFL	4.3	4.9	4.8	0.1379	-	-	-
		LFL-50%	4.4	5.03	4.93	0.2068	-	-	-
22.	Catastrophic rupture of Toluene storage tank T-122 (3000 kl)	UFL	45	44	48	0.02068	929	855	819
		LFL	260	230	220	0.1379	495	425	387

Scenario No.	Scenario Description	Hazard Distances-Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
		LFL-50%	388	355	346	0.2068	465	398	362
23.	Major leak (25 mm) in toluene storage tank T-122 (3000 kl)	UFL	5.38	5.35	5.30	0.02068	17.5	17.4	17.7
		LFL	6.68	6.13	5.60	0.1379	11.9	11.9	12.0
		LFL-50%	15.9	13.3	10.1	0.2068	11.51	11.48	11.55
24.	Minor leak (10 mm) in toluene storage tank T-122 (3000 kl)	UFL	3.8	4.2	3.8	0.02068	-	-	-
		LFL	4.4	4.8	5.04	0.1379	-	-	-
		LFL-50%	7.54	5.73	5.09	0.2068	-	-	-
25.	Catastrophic rupture of gasoil storage tank T-101 (15040 kl)	UFL	55	48	47	0.02068	980	965	990
		LFL	110	106	116	0.1379	480	484	490
		LFL-50%	180	178	192	0.2068	185	192	196
26.	Major leak (25 mm) in gasoil storage tank T-101 (15040 kl)	UFL	5.8	5.8	5.8	0.02068	31	31	22
		LFL	8.7	7.6	6.1	0.1379	22	22	13
		LFL-50%	25.5	23.2	17.2	0.2068	22	22	12
27.	Minor leak (10 mm) in gasoil storage tank T-101 (15040 kl)	UFL	3.54	3.38	3.12	0.02068	-	-	-
		LFL	4.3	4.35	4.76	0.1379	-	-	-
		LFL-50%	4.4	4.42	4.81	0.2068	-	-	-

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
28.	Catastrophic rupture of motor spirit storage tank T-01 (2944 kl)	UFL	245	232	198	0.02068	1830	1960	1642
		LFL	780	712	708	0.1379	1421	1034	900
		LFL-50%	980	825	812	0.2068	1123	1025	985
29.	Major leak (25 mm) in motor spirit storage tank T-01 (2944 kl)	UFL	8.56	9.12	9.01	0.02068	210	195	165
		LFL	63	58	42	0.1379	184	162	114
		LFL-50%	95	92	90	0.2068	94	83	62
30.	Minor leak (10 mm) in motor spirit storage tank T-01 (2944 kl)	UFL	5.23	5.12	4.98	0.02068	150	148	132
		LFL	38	41	34	0.1379	60	51	38
		LFL-50%	28	24	20	0.2068	38	30	24
31.	Loss of containment from Naphtha tanker 30 MT	UFL	31	28	25	0.02068	363	344	335
		LFL	82	83	86	0.1379	161	152	147
		LFL-50%	101	111	121	0.2068	147	140	136
32.	Loss of containment from Acetic acid tanker 30MT	UFL	4.65	4.71	4.86	0.02068	-	-	-
		LFL	4.69	4.76	4.92	0.1379	-	-	-
		LFL-50%	4.71	4.77	4.94	0.2068	-	-	-
33.	Loss of containment from methanol tanker 30MT	UFL	4.52	4.57	4.74	0.02068	93	90	88
		LFL	55.5	53.3	55.9	0.1379	81	65	74

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
		LFL-50%	190	134	159	0.2068	81	64	73
34.	Loss of containment from P-Xylene tanker 30 MT	UFL	3.54	3.59	3.71	0.02068	122	40	NH
		LFL	76	22	3.75	0.1379	96	32	NH
		LFL-50%	131	54	58	0.2068	94	32	NH
35.	Loss of containment from toluene tanker 30 MT	UFL	3.30	3.34	3.46	0.02068	1029	46	76
		LFL	28	29	27	0.1379	56	47	43
		LFL-50%	42	46	52	0.2068	52	46	42
36.	Loss of containment from VAM tanker 30 MT	UFL	4.11	4.16	4.3	0.02068	150	127	121
		LFL	33	32	29	0.1379	68	59	54
		LFL-50%	50	51	51	0.2068	62	55	51
37.	Loss of containment from Naphtha tanker 20 MT	UFL	26	24	22	0.02068	315	301	292
		LFL	70	72	74	0.1379	139	132	127
		LFL-50%	87	97	108	0.2068	126	120	117
38.	Loss of containment from acetic acid tanker 20 MT	UFL	3.99	4.04	4.17	0.02068	-	-	-
		LFL	4.02	4.08	4.20	0.1379	-	-	-
		LFL-50%	4.04	4.09	4.22	0.2068	-	-	-

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
39.	Loss of containment from methanol tanker 20 MT	UFL	3.87	3.92	4.05	0.02068	79	83	84
		LFL	48.9	54	54	0.1379	64	65	73
		LFL-50%	161	166	128	0.2068	63	64	72
40.	Loss of containment from P- Xylene tanker 20 MT	UFL	3.03	3.07	3.16	0.02068	87	NH	NH
		LFL	58	3.10	14.02	0.1379	74	NH	NH
		LFL-50%	110	45	48	0.2068	73	NH	NH
41.	Loss of containment from Toluene tanker 20 MT	UFL	2.82	2.86	2.94	0.02068	91	72	65
		LFL	23	24	22	0.1379	45	40	34
		LFL-50%	37	37	46	0.2068	42	38	33
42.	Loss of containment from vinyl acetate monomer (VAM) tanker 20 MT	UFL	3.52	3.57	3.67	0.02068	133	116	104
		LFL	28	27	24	0.1379	59	52	46
		LFL-50%	43	47	44	0.2068	54	47	42
43.	Acetic acid pump P-40 discharge line full bore rupture	UFL	8.12	7.92	7.3	0.02068		15.3	15.4
		LFL	8.2	8.02	7.36	0.1379		11.3	11.4
		LFL-50%	9.83	10.0	10.2	0.2068		11.07	11.4
44.	Gasoil pump P-101 discharge line full bore rupture	UFL	9.2	8.8	9.3	0.02068	111	84	122
		LFL	36	28	40	0.1379	80	51	83

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
		LFL-50%	77	47	75	0.2068	78	49	80
45.	Methanol pump P-119 discharge line full bore rupture	UFL	9.12	10.38	10.9	0.02068	80	78	99
		LFL	24.4	24.3	29.4	0.1379	50	49	70
		LFL-50%	43.5	40.3	70.9	0.2068	48	47	67
46.	Naphtha pump P- 01 discharge line full bore rupture	UFL	31	30	32	0.02068	484	480	429
		LFL	172	158	129	0.1379	238	271	237
		LFL-50%	221	214	179	0.2068	233	257	222
47.	P-Xylene pump P-39 discharge line full bore rupture	UFL	8.4	8.2	8.2	0.02068	39	62	48
		LFL	14	15	13	0.1379	25	45	34
		LFL-50%	27	45	38	0.2068	23	44	33
48.	Toluene pump P-122 discharge line full bore rupture	UFL	8.12	8.74	8.07	0.02068	118	146	134
		LFL	37	46	43	0.1379	67	97	86
		LFL-50%	58	80	73	0.2068	63	93	82
49.	VAM pump P-24 discharge line full bore rupture	UFL	8.88	8.74	9.29	0.02068	212	175	158
		LFL	70	57	50	0.1379	116	104	92
		LFL-50%	102	87	74	0.2068	110	99	87

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
1.	Catastrophic rupture of Naphtha storage tank T-01 (2944 kl)	4	289	290	296	4	-	-	-
		12.5	211	209	214	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
2.	Major leak (25 mm) in Naphtha storage tank T-01 (2944 kl)	4	29	29	29	4	65	62	59
		12.5	22	23	23	12.5	49	46	43
		37.5	NR	NR	NR	37.5	40	37	34
3.	Minor leak (10 mm) in Naphtha storage tank T-01 (2944 kl)	4	20.6	20.6	20.9	4	28	27	25
		12.5	15.7	16	16.9	12.5	21	20	19
		37.5	11.4	12	13.8	37.5	17	16	15
4.	Catastrophic rupture of Acetic acid storage tank T-40 (2960 kl)	4	26	26	29	4	-	-	-
		12.5	15	16	19	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
5.	Major leak (25 mm) in Acetic acid storage tank T-40 (2960 kl)	4	26	27	27	4	17	17	16
		12.5	16	16	17	12.5	14	13	13
		37.5	NR	NR	NR	37.5	NR	NR	NR

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
6.	Minor leak (10 mm) in acetic acid storage tank T-40 (2960 kl)	4	22	22	22	4	-	-	-
		12.5	13	13	14	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
7.	Catastrophic rupture of methanol storage tank T-32 (1000 kl)	4	30	30	32	4	-	-	-
		12.5	20	21	25	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
8.	Major leak (25 mm) in methanol storage tank T-32 (1000 kl)	4	55	59	68	4	29	34	36
		12.5	40	46	57	12.5	12.5	6.89	19.5
		37.5	29	34	45	37.5	NR	NR	NR
9.	Minor leak (10 mm) in methanol storage tank T-32 (1000 kl)	4	20	23	25	4	4.69	8.90	9.66
		12.5	14	18	20	12.5	NR	NR	NR
		37.5	NR	NR	NR	37.5	NR	NR	NR
10.	Catastrophic rupture of storage tank P-Xylene T-39 (1460 kl)	4	943	948	951	4	-	-	-
		12.5	593	599	609	12.5	-	-	-
		37.5	377	390	408	37.5	-	-	-

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
11.	Major leak(25 mm) in P-Xylene storage tank T-39 (14600 kl)	4	55	56	56	4	17	16	16
		12.5	36	37	38	12.5	13	13	12
		37.5	22	24	26	37.5	11	10	10
12.	Minor leak (10 mm) in P-xylene storage tank T-39 (1460 kl)	4	54	55	55	4	8.78	8.52	8.17
		12.5	35	36	37	12.5	6.74	6.46	6.12
		37.5	20	23	25	37.5	6.23	5.82	4.54
13.	Catastrophic rupture of Vinyl Acetate Monomer VAM storage tank T-24 (1458 kl)	4	637	639	646	4	-	-	-
		12.5	406	414	424	12.5	-	-	-
		37.5	250	263	285	37.5	-	-	-
14.	Major leak (25 mm) in storage tank Vinyl Acetate Monomer VAM T-24(1458 kl)	4	33	33	34	4	33	32	30
		12.5	22	23	24	12.5	26	25	24
		37.5	10	11	11	37.5	21	20	19
15.	Minor leak (10 mm) in storage tank Vinyl Acetate Monomer (VAM) T-24 (1458 kl)	4	31	32	33	4	16	15	14
		12.5	20	22	24	12.5	13	12	11
		37.5	9.8	10.1	11	37.5	NR	NR	NR
16.	Catastrophic rupture of methanol storage tank T-	4	602	598	610	4	-	-	-

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
	119 (5000 kl)	12.5	426	429	447	12.5	-	-	-
		37.5	295	289	303	37.5	-	-	-
17.	Major leak (25 mm) in methanol storage tank T-119 (5000 kl)	4	29	30	30	4	35	34	32
		12.5	21	22	23	12.5	28	27	26
		37.5	NR	NR	NR	37.5	NR	NR	NR
18.	Minor leak (10 mm) in Methanol storage tank T-119 (5000 kl)	4	25	25	26	4	17	16.5	15.4
		12.5	17	18	19	12.5	NR	NR	NR
		37.5	NR	NR	NR	37.5	NR	NR	NR
19.	Catastrophic rupture of storage tank P-Xylene T-115 (5000 kl)	4	1621	1627	1634	4	-	-	-
		12.5	1028	1036	1053	12.5	-	-	-
		37.5	666	683	711	37.5	-	-	-
20.	Major leak (25 mm) in P-xylene storage tank T-115 (5000 kl)	4	21	20	20	4	58	59	59
		12.5	16	16	15	12.5	39	40	41
		37.5	13	13	12	37.5	24	26	29
21.	Minor leak (10 mm) in P-Xylene storage tank T-	4	56	58	58	4	10.8	10.5	10.08

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (KW/m2)	Distance in meters			Radiation Levels (KW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
	115 (5000 kl)	12.5	37	38	39	12.5	8.43	8.07	7.58
		37.5	22	25	27	37.5	7.21	6.7	6.08
22.	Catastrophic rupture of Toluene storage tank T-122 (3000 kl)	4	410	430	463	4	-	-	-
		12.5	226	225	230	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
23.	Major leak (25 mm) in toluene storage tank T-122 (3000 kl)	4	37	37	39	4	28	27	26
		12.5	23	25	27	12.5	22	21	20
		37.5	11	11	11	37.5	19	17	16
24.	Minor leak (10 mm) in toluene storage tank T-122 (3000 kl)	4	36	37	38	4	15	15	14
		12.5	22	24	26	12.5	12	11	10
		37.5	10	11	11	37.5	9.9	9.4	8.78
25.	Catastrophic rupture of gasoil storage tank T-101 (15040 kl)	4	320	318	291	4	-	-	-
		12.5	230	229	220	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
26.	Major leak (25 mm) in gasoil storage tank T-101	4	44	46.5	48.2	4	24	23	23

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
	(3000 kl)	12.5	23	24.8	26.8	12.5	18	18	17
		37.5	NR	NR	NR	37.5	15	14	13
27.	Minor leak (10 mm) in gasoil storage tank T-101 (3000 kl)	4	36	36	38	4	11.8	11.5	11.12
		12.5	22	23	26	12.5	9.16	8.8	8.32
		37.5	12	12	12	37.5	7.4	7	6.6
28.	Catastrophic rupture of motor spirit storage tank T-01 (2944 kl)	4	295	291	289	4	-	-	-
		12.5	204	201	215	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
29.	Major leak (25 mm) in motor spirit storage tank T-01 (2944 kl)	4	31	34	30	4	72	68	61
		12.5	26	24	23	12.5	48	43	48
		37.5	NR	NR	NR	37.5	38	37	31
30.	Minor leak (10 mm) in motor spirit storage tank T-01 (2944 kl)	4	24	22	19	4	41	43	38
		12.5	18	13	17	12.5	28	26	21
		37.5	NR	NR	NR	37.5	17	19	21
31.	Loss of containment from Naphtha tanker 30 MT	4	20	21	21	4	-	-	-

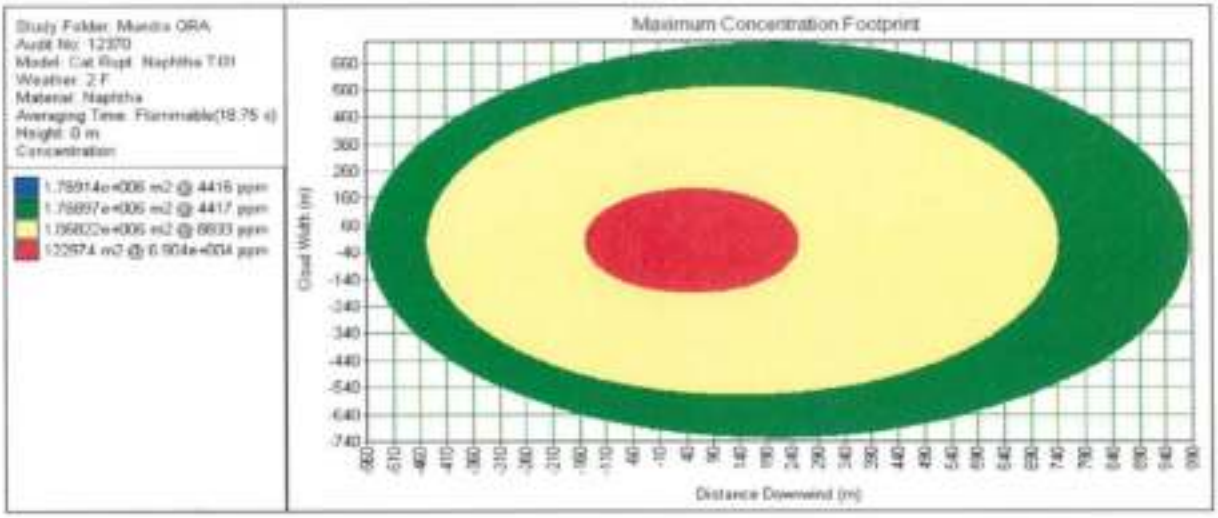
Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
		12.5	14	14	15	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
32.	Loss of containment from Acetic acid tanker 30MT	4	101	103	104	4	-	-	-
		12.5	64	67	72	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
33.	Loss of containment from methanol tanker 30MT	4	123	123	124	4	-	-	-
		12.5	81	84	87	12.5	-	-	-
		37.5	49	49	49	37.5	-	-	-
34.	Loss of containment from P-Xylene tanker 30 MT	4	330	332	331	4	-	-	-
		12.5	204	207	212	12.5	-	-	-
		37.5	126	133	141	37.5	-	-	-
35.	Loss of containment from toluene tanker 30 MT	4	112	120	130	4	-	-	-
		12.5	47	48	50	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
36.	Loss of containment from VAM tanker 30 MT	4	213	215	217	4	-	-	-

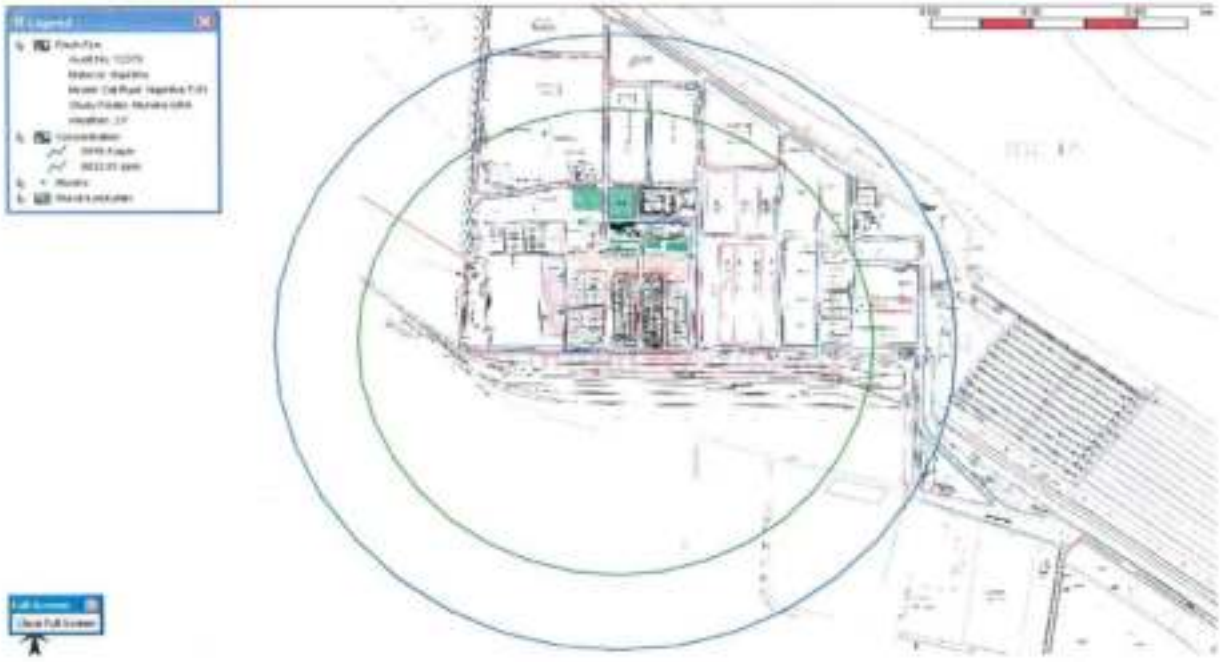
Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
		12.5	133	137	141	12.5	-	-	-
		37.5	74	80	89	37.5	-	-	-
37.	Loss of containment from Naphtha tanker 20 MT	4	20	21	21	4	-	-	-
		12.5	14	14.2	15.6	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
38.	Loss of containment from acetic acid tanker 20 MT	4	84	85	87	4	-	-	-
		12.5	52	56	59	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
39.	Loss of containment from methanol tanker 20 MT	4	102	103	104	4	-	-	-
		12.5	67	70	72	12.5	-	-	-
		37.5	40	40	40	37.5	-	-	-
40.	Loss of containment from P- Xylene tanker 20 MT	4	274	276	276	4	-	-	-
		12.5	170	173	177	12.5	-	-	-
		37.5	104	110	117	37.5	-	-	-
41.	Loss of containment from Toluene tanker 20 MT	4	95	102	111	4	-	-	-

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (KW/m2)	Distance in meters			Radiation Levels (KW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
		12.5	39	40	41	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
42.	Loss of containment from vinyl acetate monomer (VAM) tanker 20 MT	4	178	179	181	4	-	-	-
		12.5	111	115	118	12.5	-	-	-
		37.5	60	65	73	37.5	-	-	-
43.	Acetic acid pump P-40 discharge line full bore rupture	4	93	94	95	4	41	39	40
		12.5	61	64	67	12.5	33	32	32
		37.5	NR	NR	NR	37.5	NR	NR	NR
44.	Gasoil pump P-101 discharge line full bore rupture	4	93	98	104	4	66	64	68
		12.5	45	45	47	12.5	51	48	50
		37.5	NR	NR	NR	37.5	41	38	40
45.	Methanol pump P-119 discharge line full bore rupture	4	100	101	103	4	103	104	99
		12.5	69	72	75	12.5	64	66	81
		37.5	45	46	46	37.5	NR	NR	NR
46.	Naphtha pump P- 01 discharge line full bore	4	65	67	66	4	211	213	208

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
	rupture	12.5	43	45	46	12.5	158	158	151
		37.5	NR	NR	NR	37.5	127	125	118
47.	P-Xylene pump P-39 discharge line full bore rupture	4	263	265	264	4	49	51	47
		12.5	166	169	172	12.5	38	39	35
		37.5	105	110	117	37.5	31	32	28
48.	Toluene pump P-122 discharge line full bore rupture	4	97	105	112	4	72	77	75
		12.5	44	45	46	12.5	56	59	56
		37.5	NR	NR	NR	37.5	46	48	45
49.	VAM pump P-24 discharge line full bore rupture	4	177	179	180	4	116	112	112
		12.5	113	117	120	12.5	91	87	86
		37.5	65	70	77	37.5	75	72	71

Scenario No.:1





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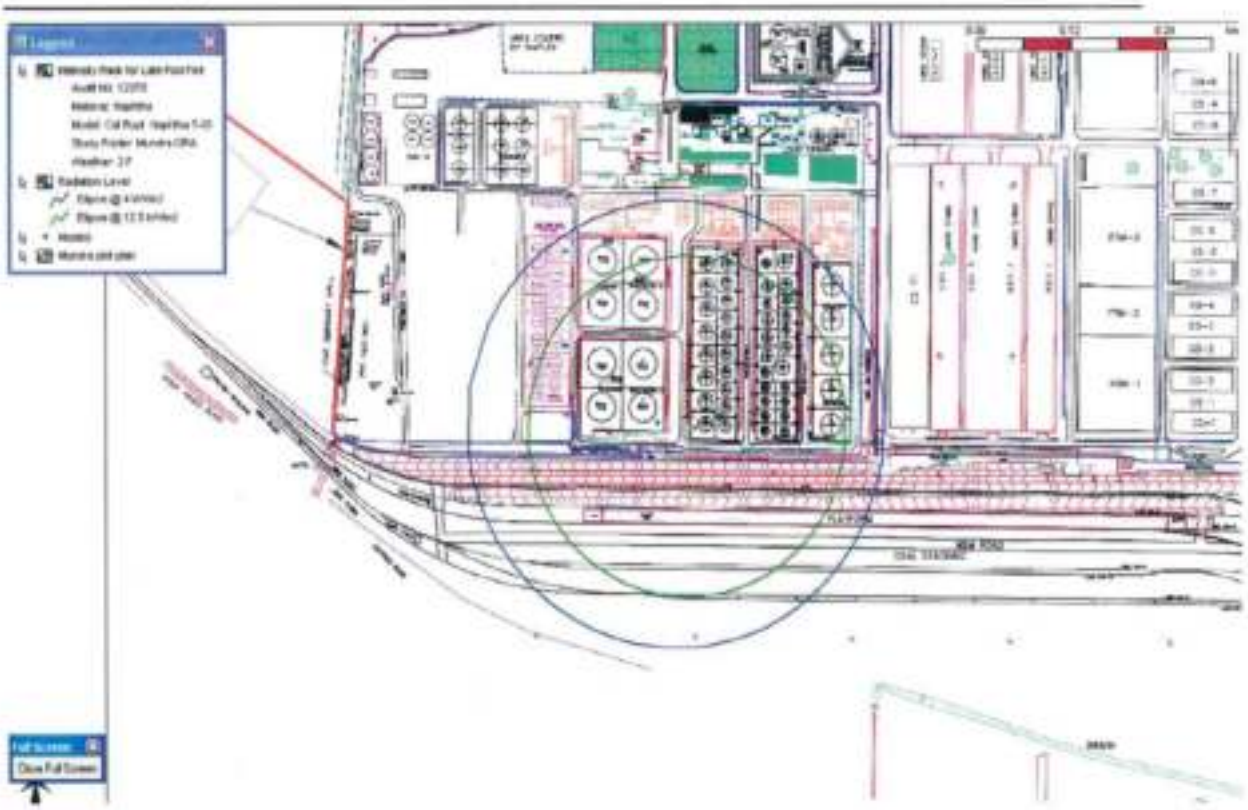

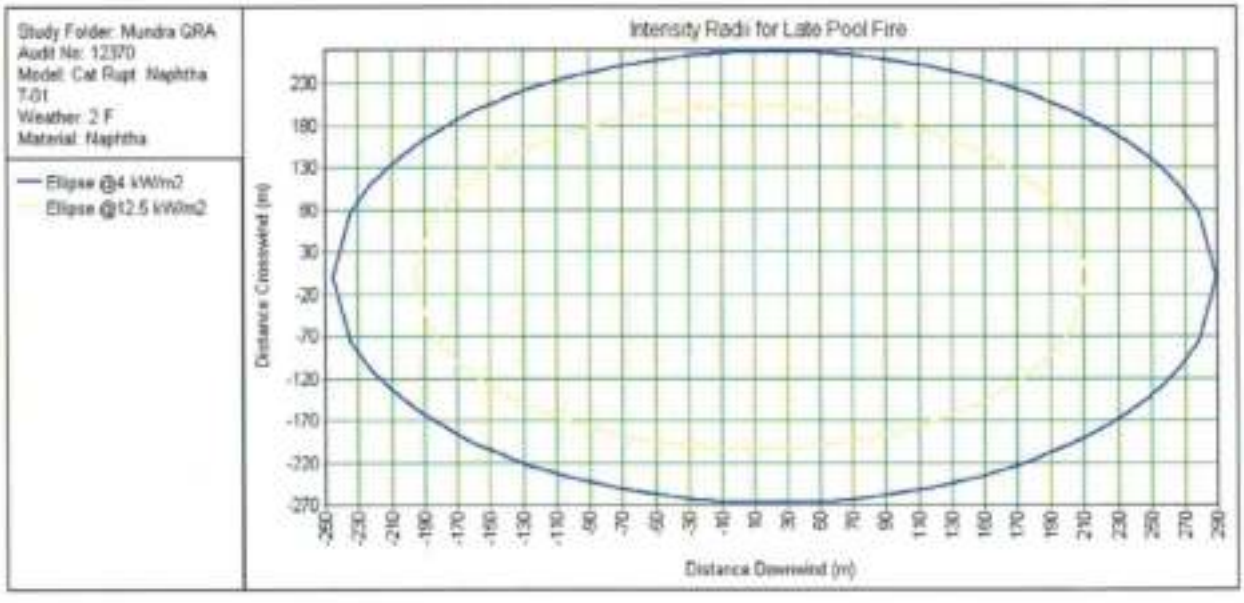

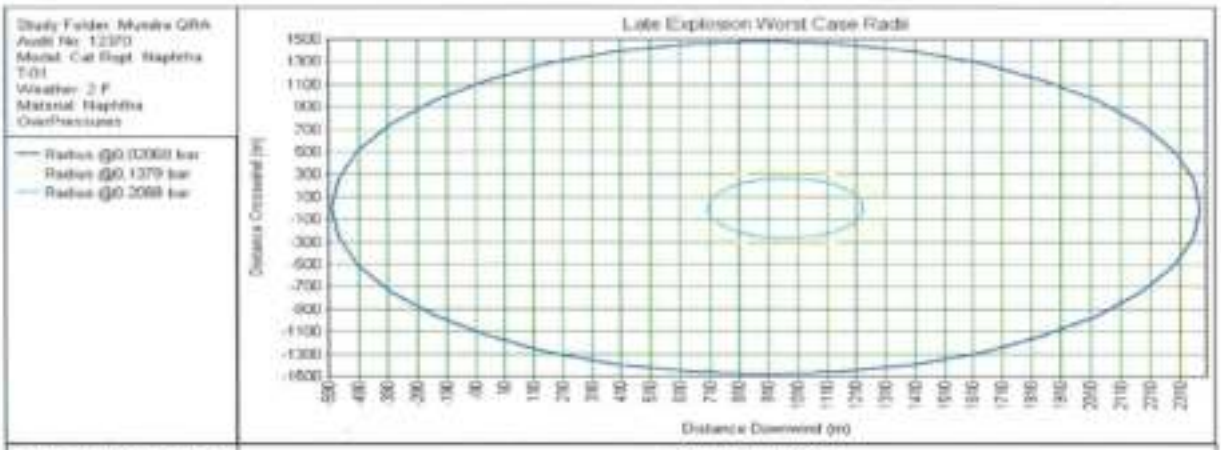

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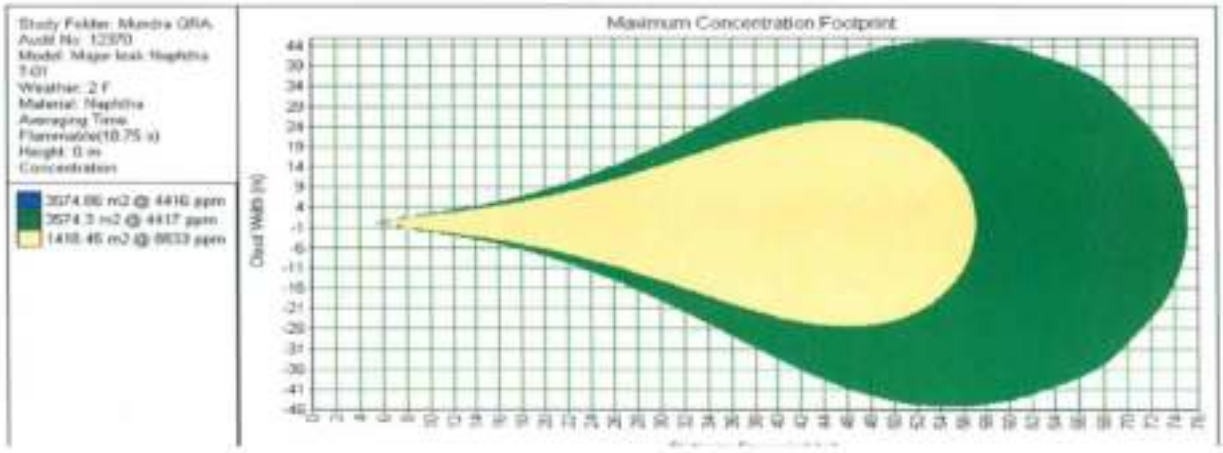

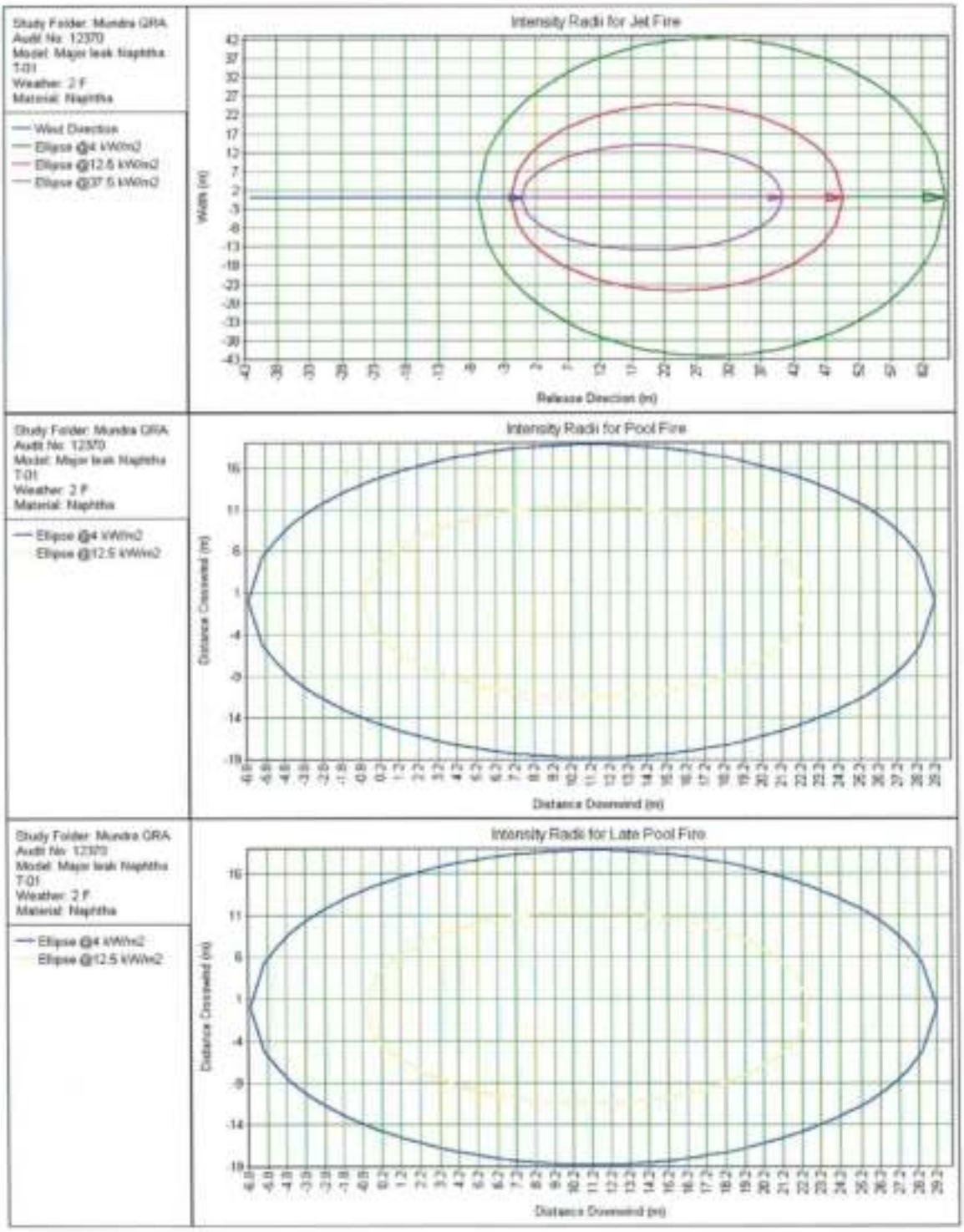
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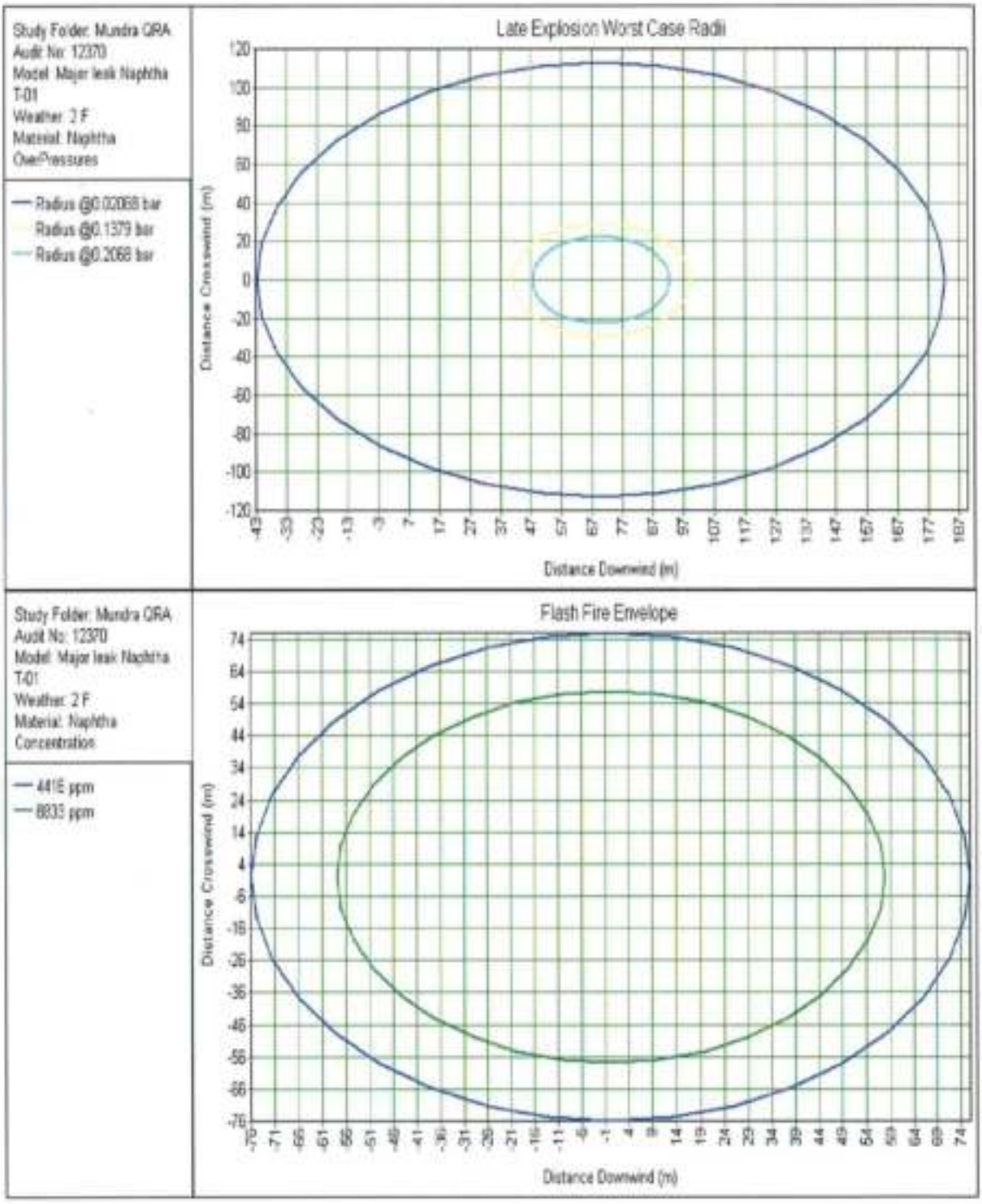
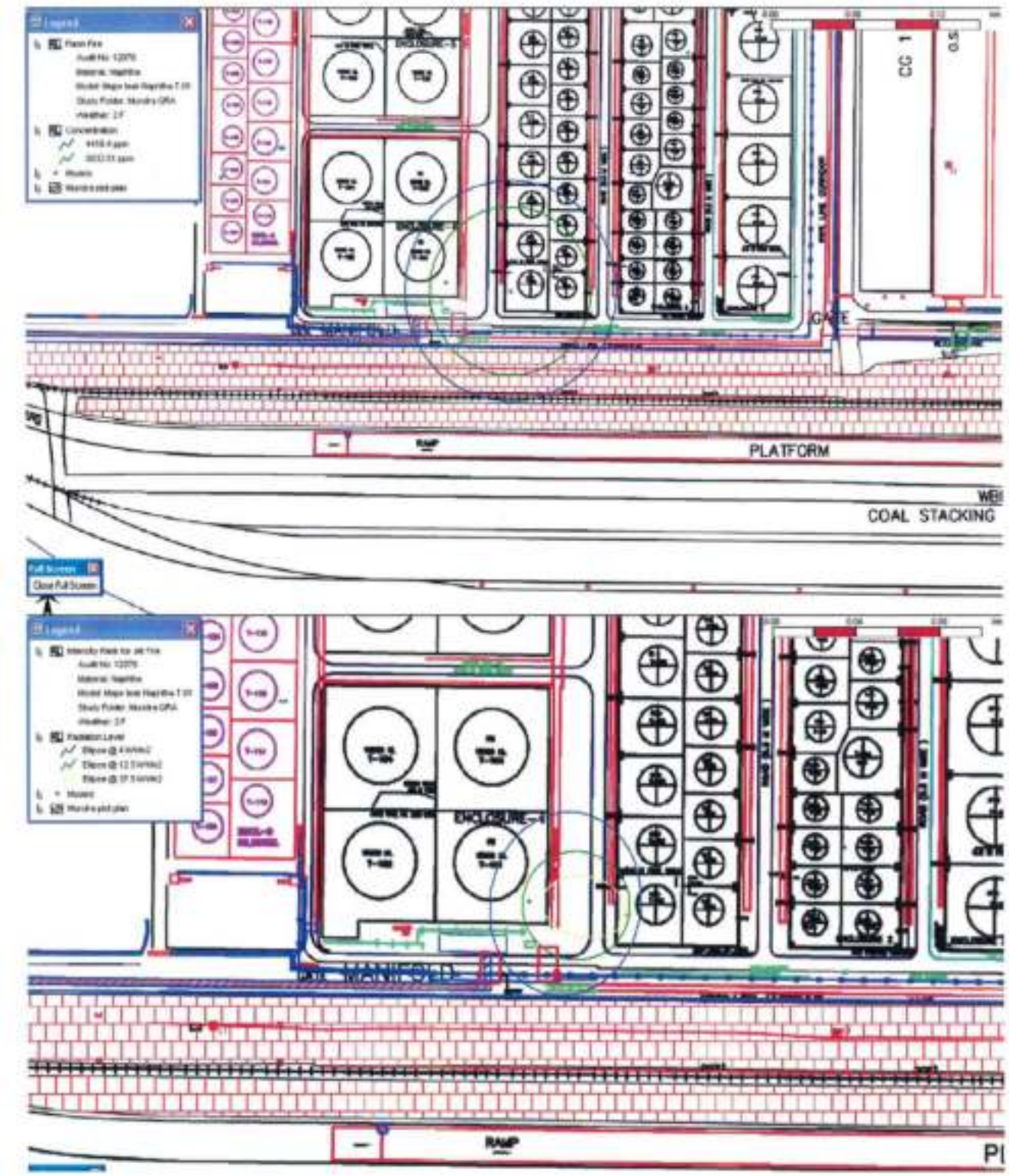
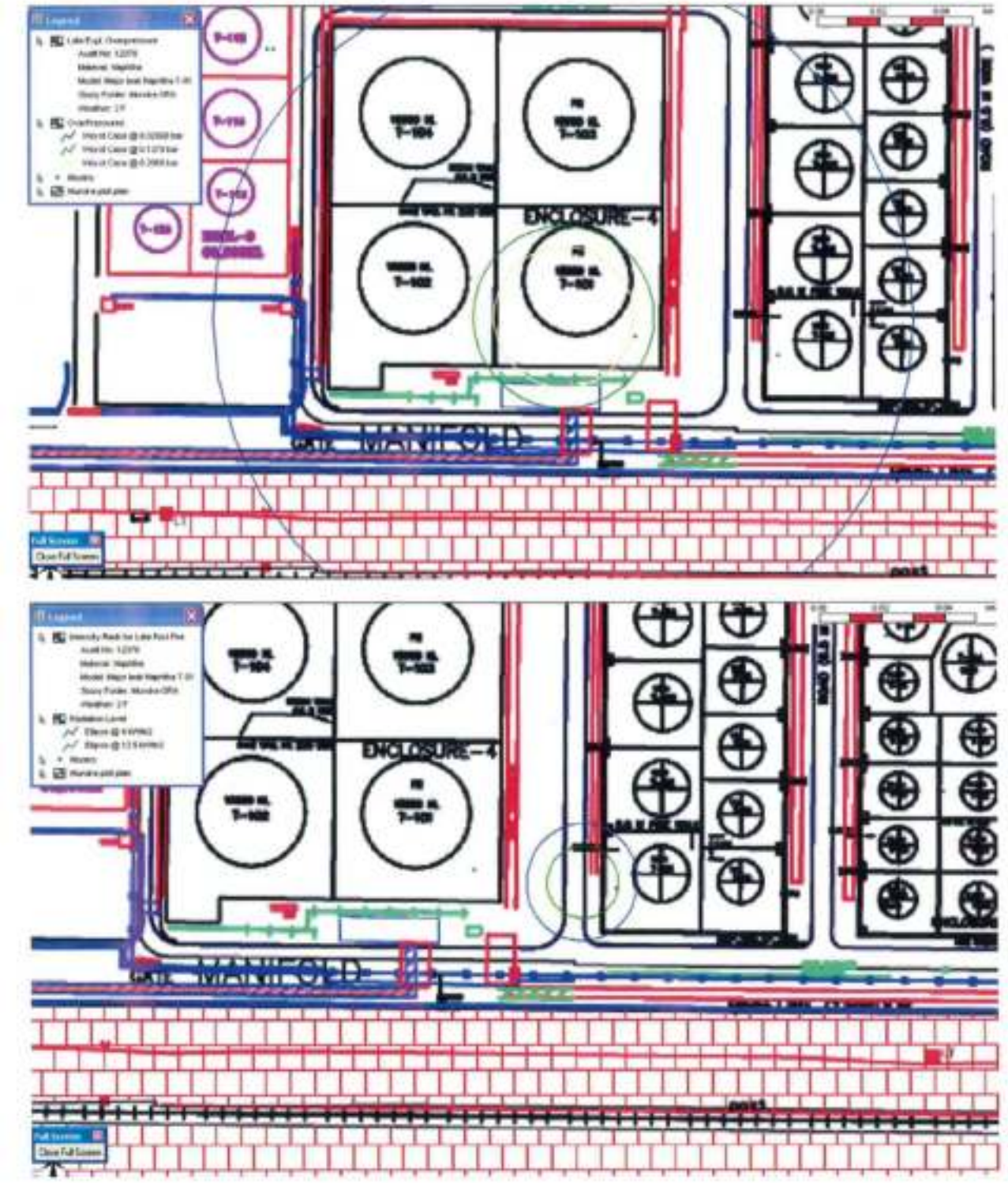
Audit No: 12370
Model: Major leak Naphtha T-01
Weather: 2 F
Material: Naphtha
Wind Direction
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Ellipse @37.5 kW/m2
Intensity Radii for Jet Fire
Width (m)
Release Direction (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Major leak Naphtha T-01
Weather: 2 F
Material: Naphtha
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Intensity Radii for Pool Fire
Distance Crosswind (m)
Distance Downwind (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Major leak Naphtha T-01
Weather: 2 F
Material: Naphtha
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Intensity Radii for Late Pool Fire
Distance Crosswind (m)
Distance Downwind (m)


Study Folder: Mundra QRA
Audit No: 12370
Model: Major leak Naphtha T-01
Weather: 2 F
Material: Naphtha
Over Pressures
Radius @0.02068 bar
Radius @0.1379 bar
Radius @0.2068 bar
Late Explosion Worst Case Radii
Distance Crosswind (m)
Distance Downwind (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Major leak Naphtha T-01
Weather: 2 F
Material: Naphtha
Concentration
4416 ppm
8833 ppm
Flash Fire Envelope
Distance Crosswind (m)
Distance Downwind (m)


PLATFORM
COAL STACKING
RAMP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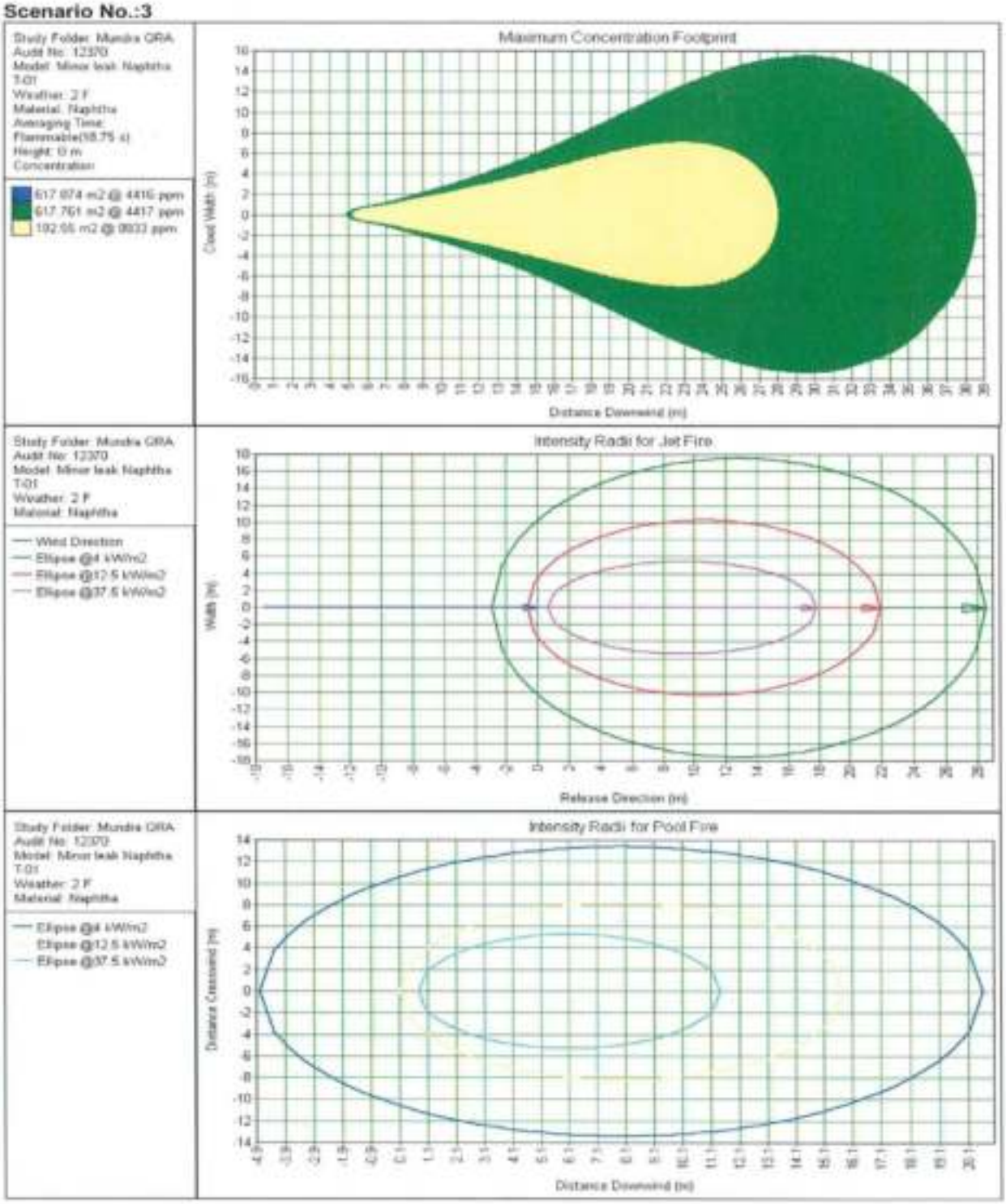
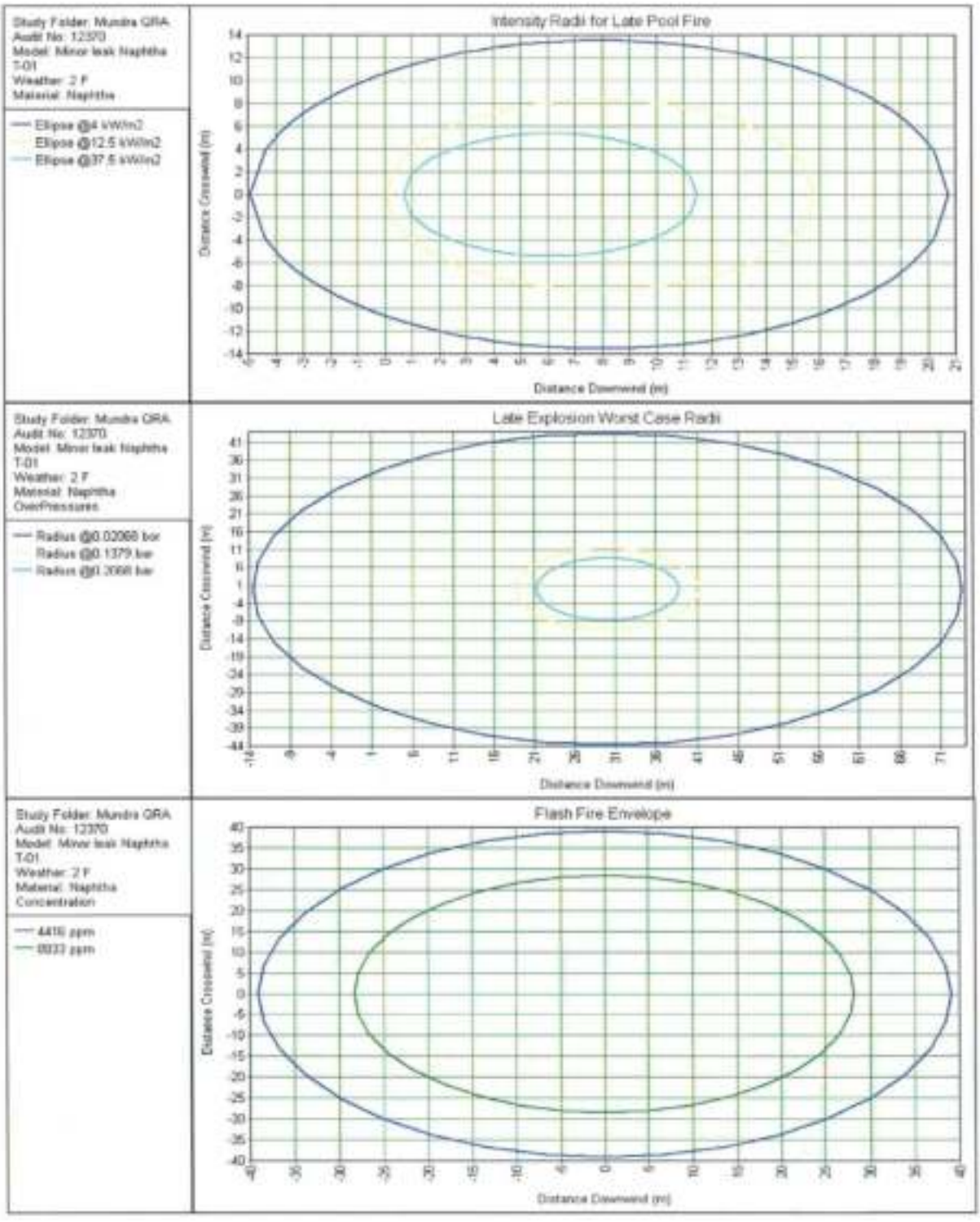
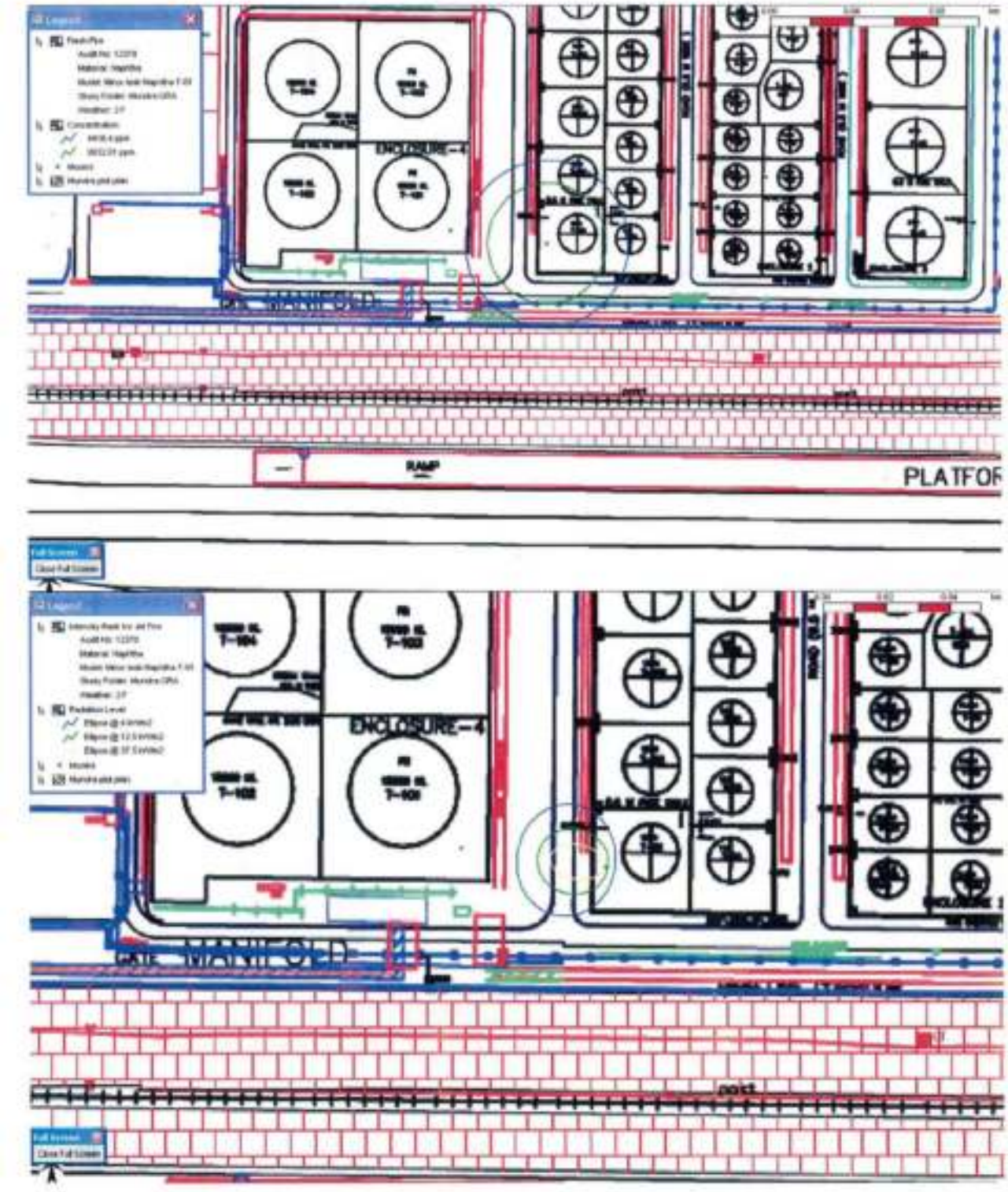
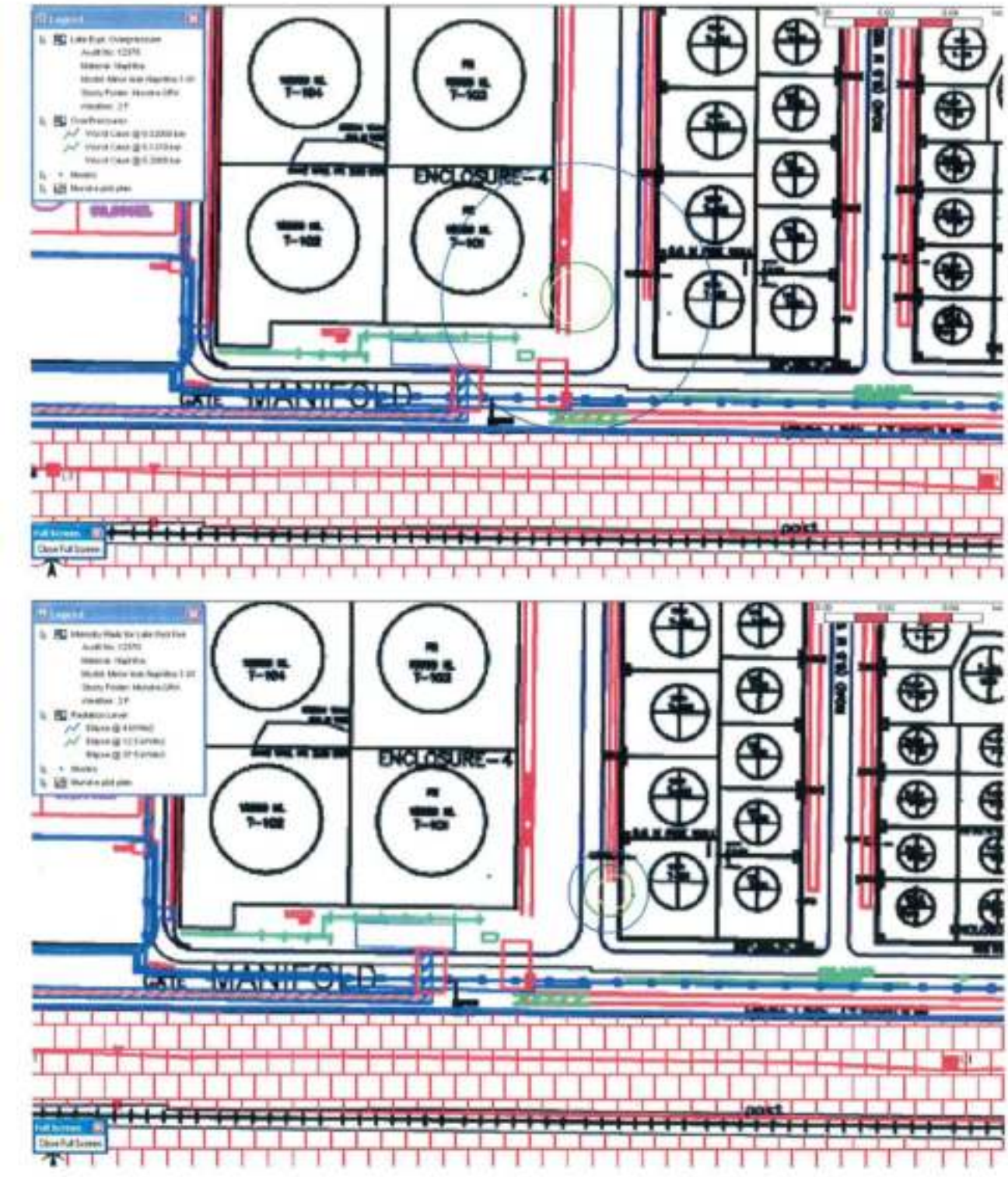
MANIFOLD
ENCLOSURE-4
MANIFOLD

Scenario No.:3

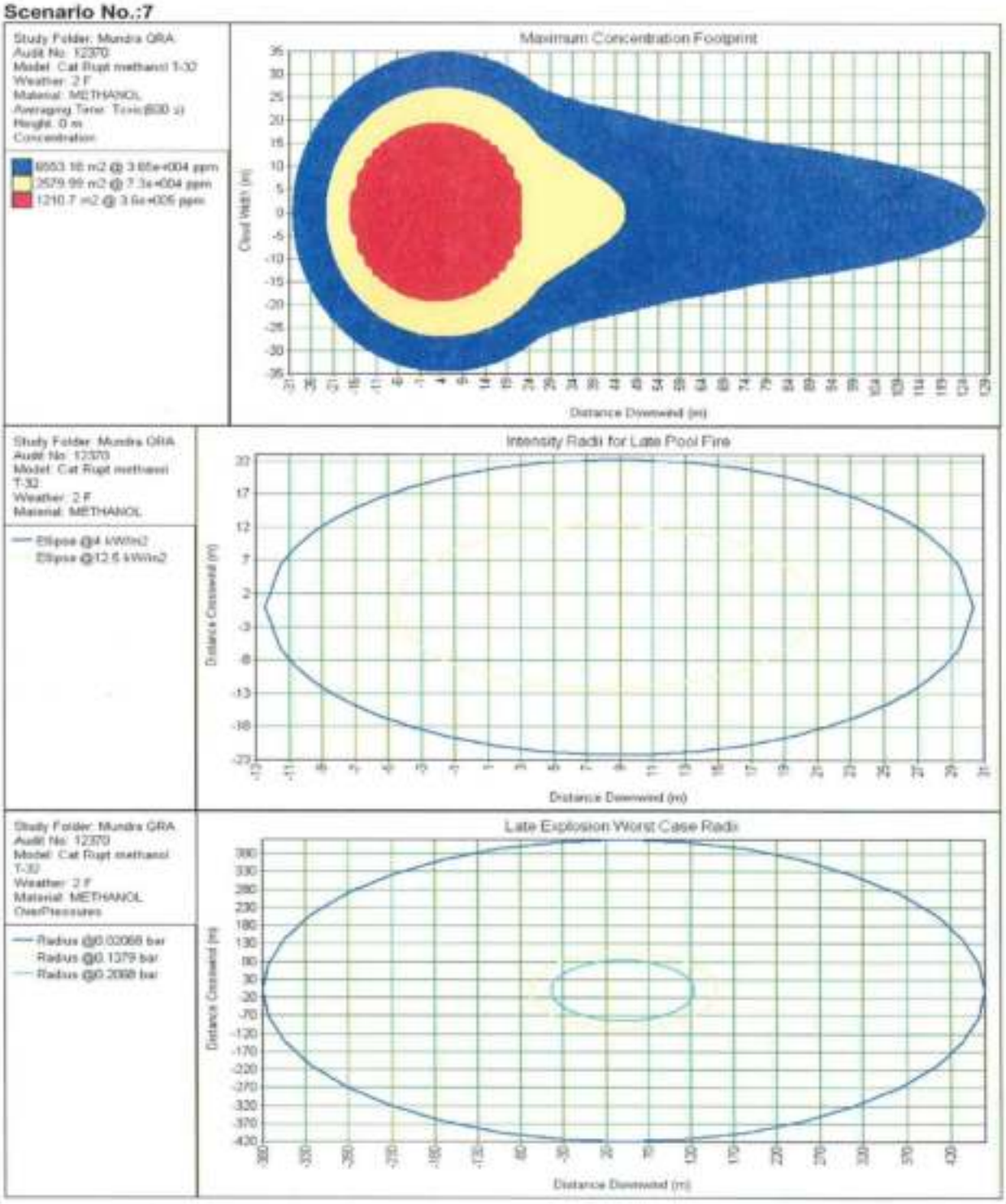


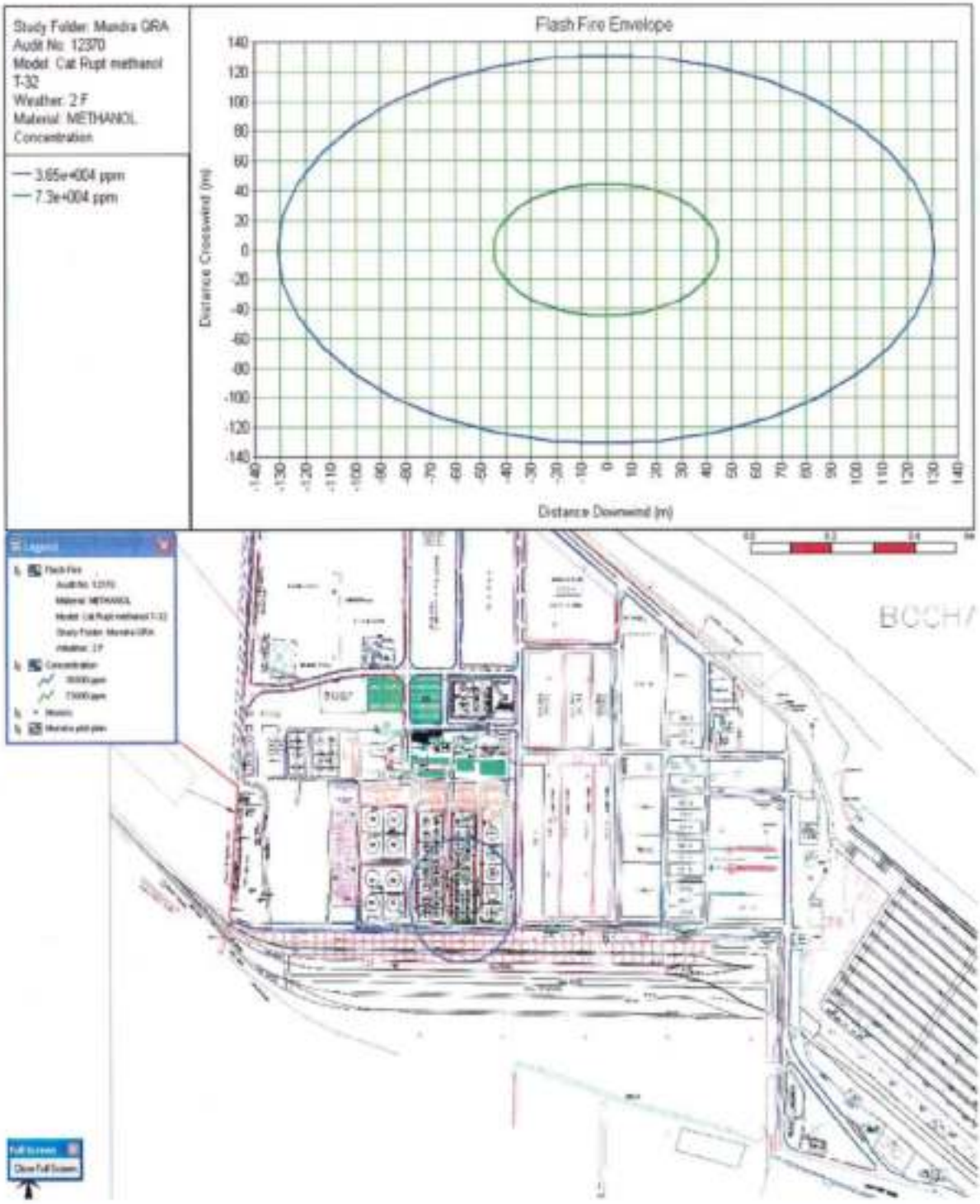

Study Folder: Mundra QRA
Audit No: 12370
Model: Minor leak Naphtha T-01
Weather: 2 F
Material: Naphtha
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Ellipse @37.5 kW/m2
Intensity Radii for Late Pool Fire
Distance Crosswind (m)
Distance Downwind (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Minor leak Naphtha T-01
Weather: 2 F
Material: Naphtha
Overpressures
Radius @0.02068 bar
Radius @0.1379 bar
Radius @0.2068 bar
Late Explosion Worst Case Radii
Distance Crosswind (m)
Distance Downwind (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Minor leak Naphtha T-01
Weather: 2 F
Material: Naphtha
Concentration
4416 ppm
8833 ppm
Flash Fire Envelope
Distance Crosswind (m)
Distance Downwind (m)

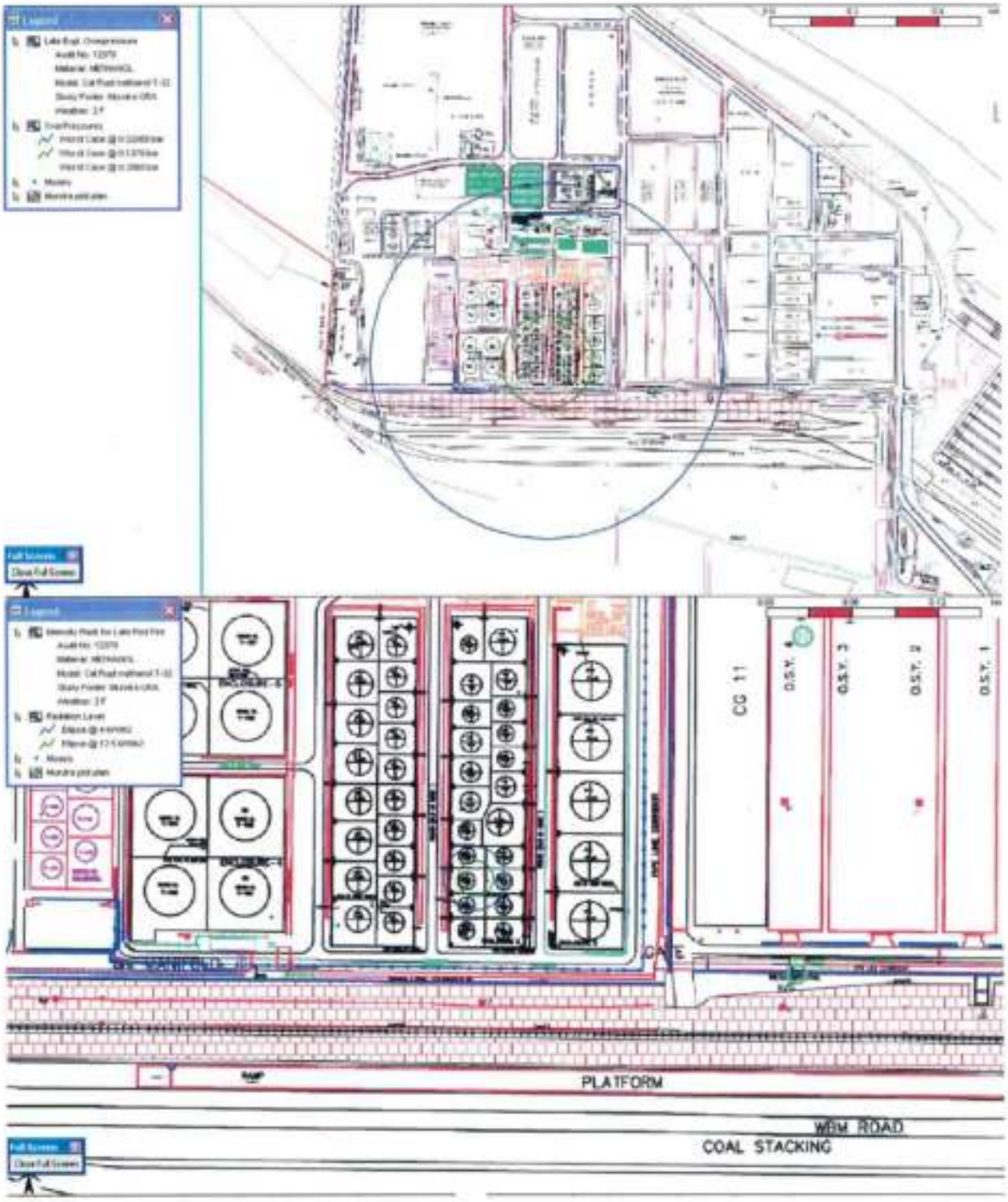

ENCLOSURE-4
RAMP
PLATFOR
ENCLOSURE-4

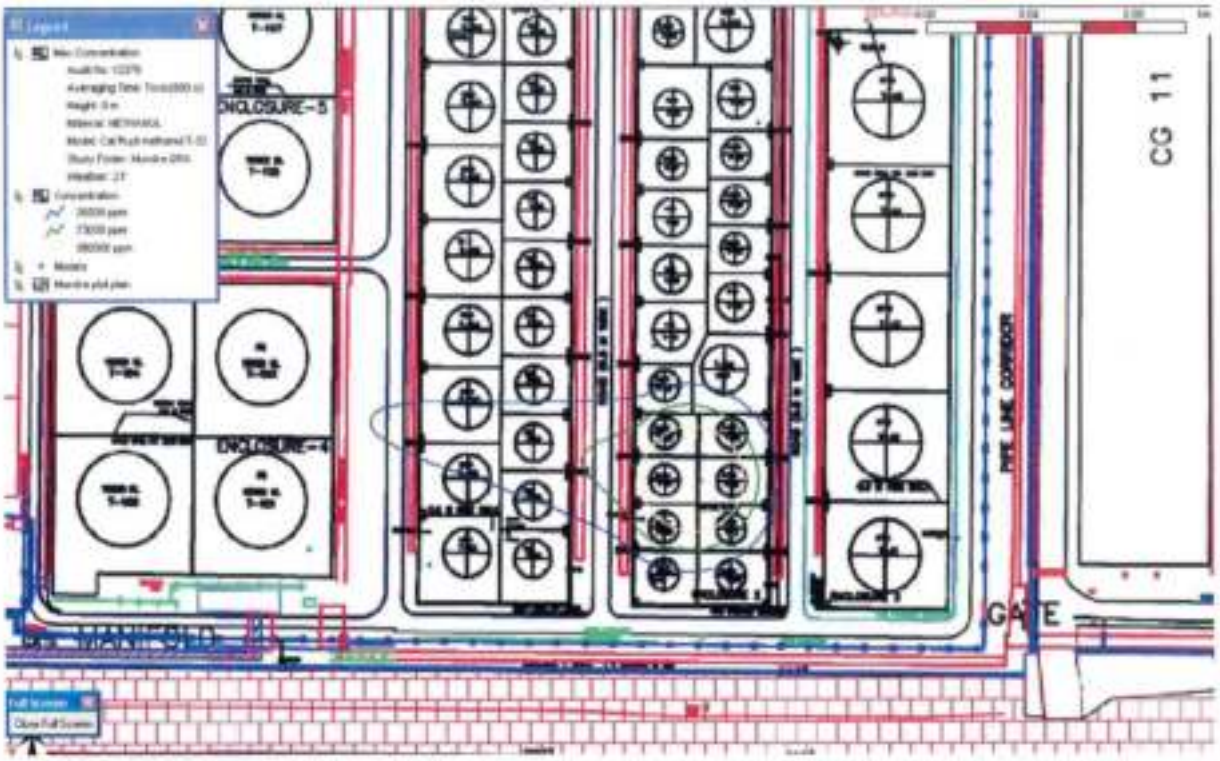

ENCLOSURE-4
ENCLOSURE-4

Scenario No.:7




Study Folder: Mundra QRA
Audit No: 12370
Model: Cat Rupt methanol T-32
Weather: 2 F
Material: METHANOL
Concentration
3.65e+004 ppm
7.3e+004 ppm
Flash Fire Envelope
Distance Crosswind (m)
Distance Downwind (m)


CG 11
O.S.Y. 4
O.S.Y. 3
O.S.Y. 2
O.S.Y. 1
PLATFORM
WBM ROAD
COAL STACKING



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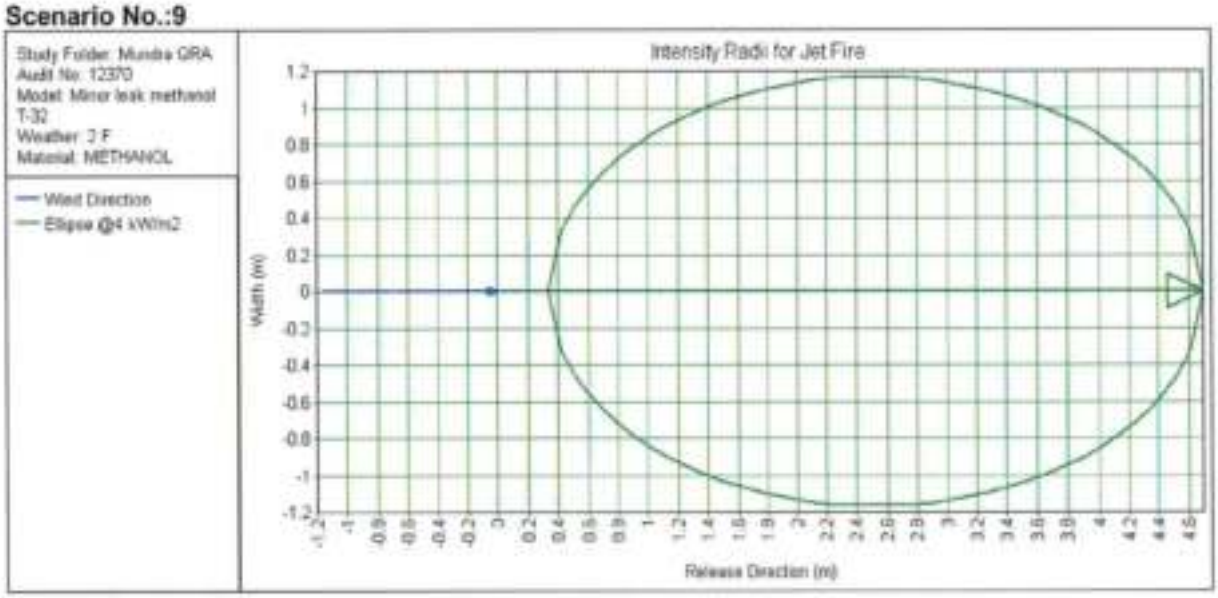
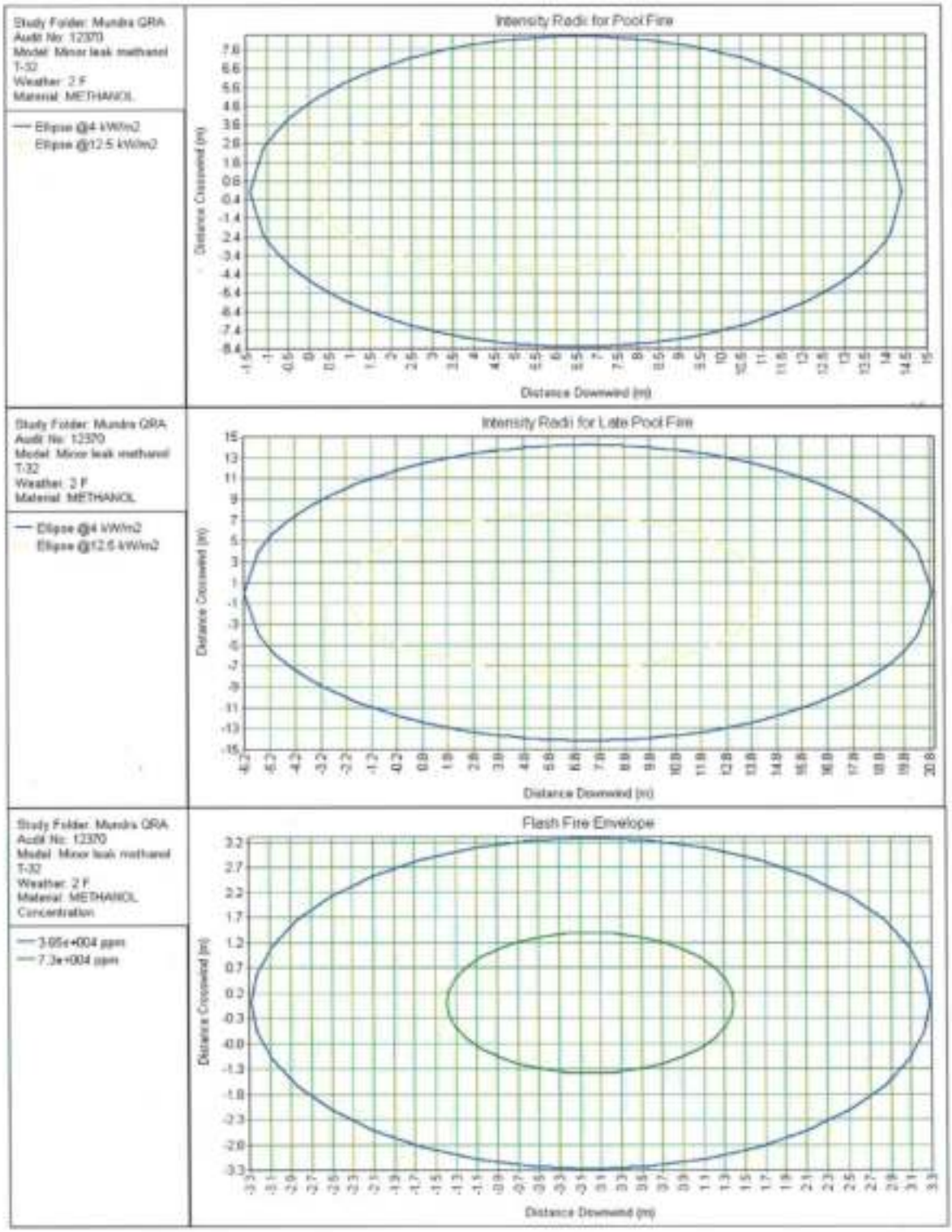
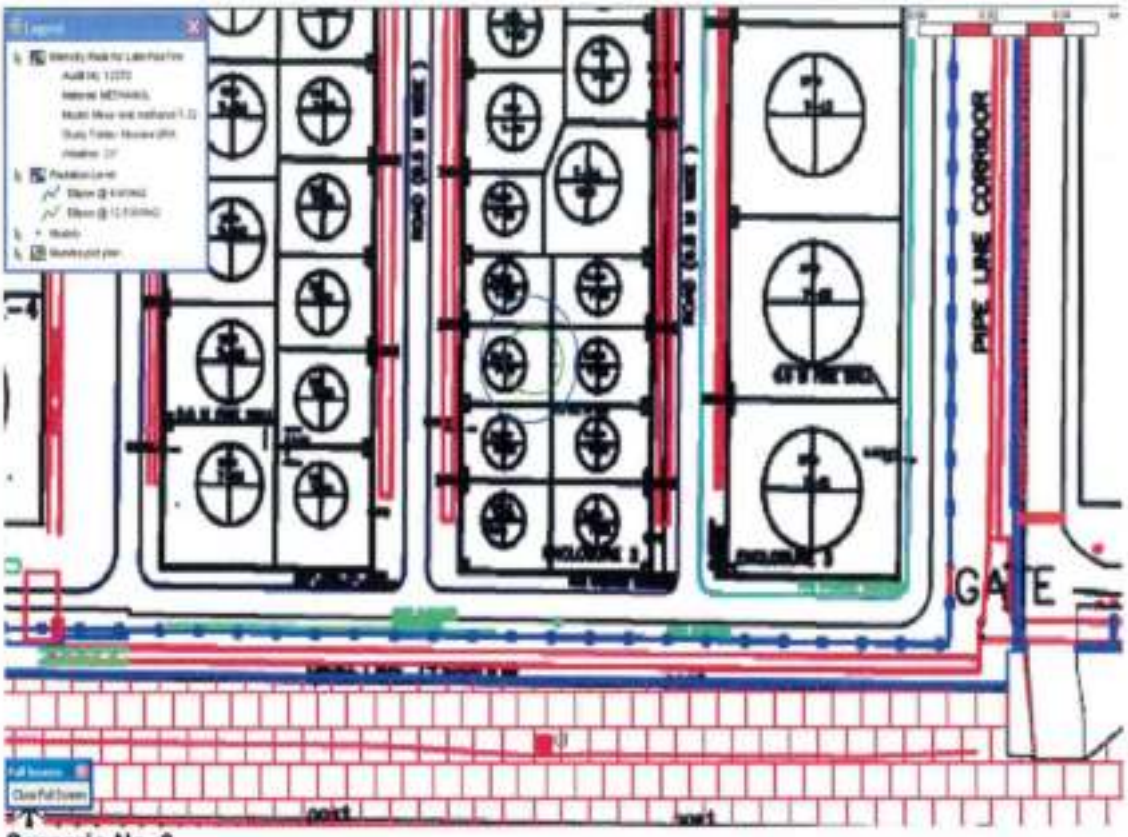



Study Folder: Mundra QRA
Audit No: 12370
Model: Minor leak methanol T-32
Weather: 2 F
Material: METHANOL
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Intensity Radii for Pool Fire
Distance Crosswind (m)
Distance Downwind (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Minor leak methanol T-32
Weather: 2 F
Material: METHANOL
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Intensity Radii for Late Pool Fire
Distance Crosswind (m)
Distance Downwind (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Minor leak methanol T-32
Weather: 2 F
Material: METHANOL
Concentration
3.05e+004 ppm
7.3e+004 ppm
Flash Fire Envelope
Distance Crosswind (m)
Distance Downwind (m)



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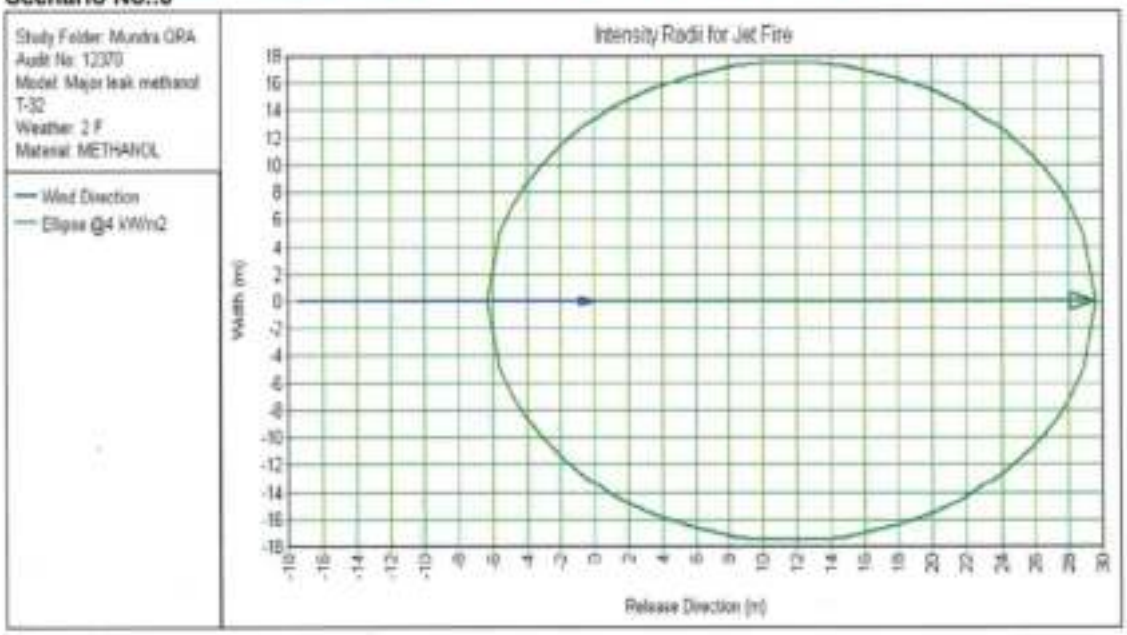
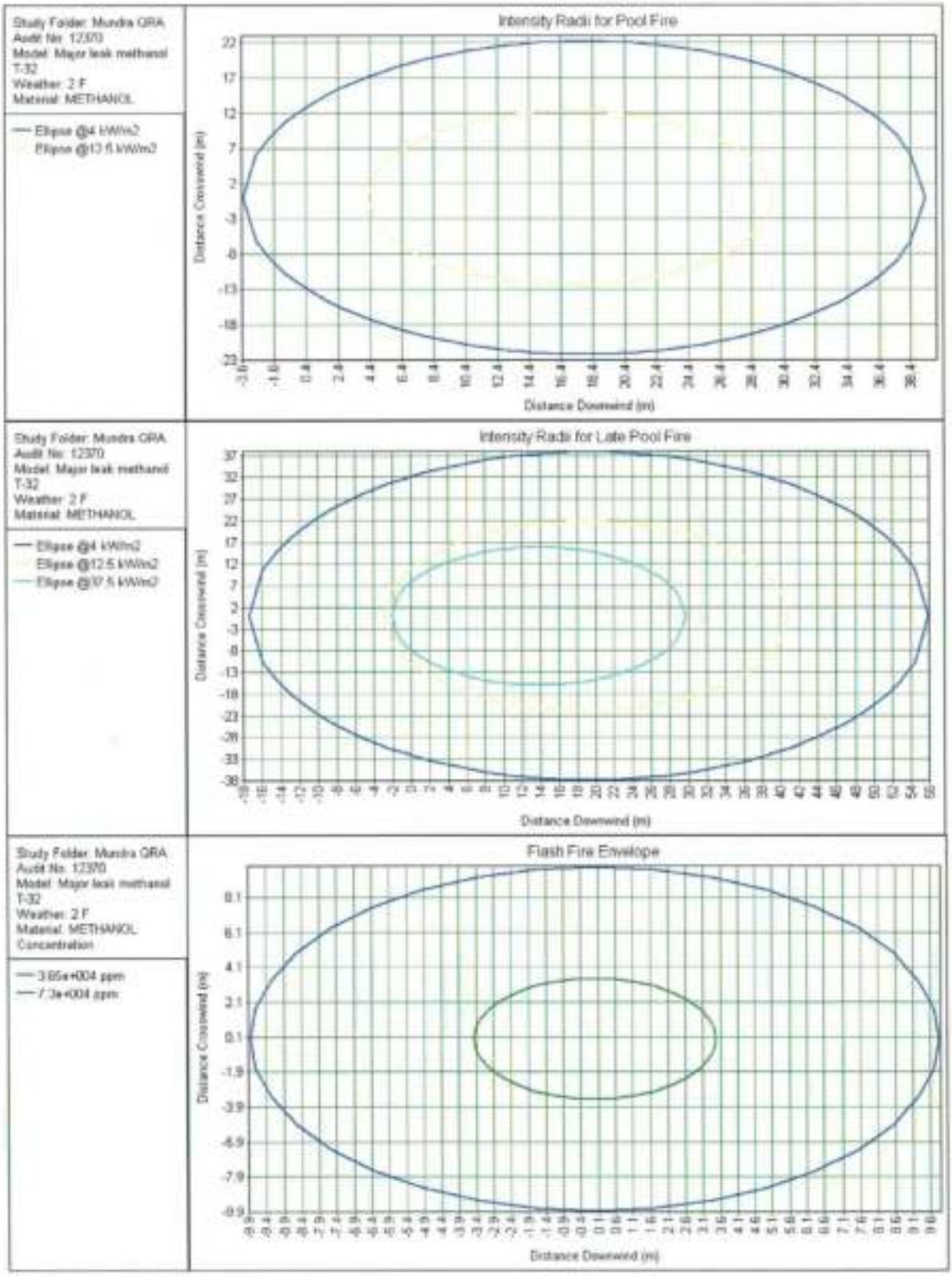
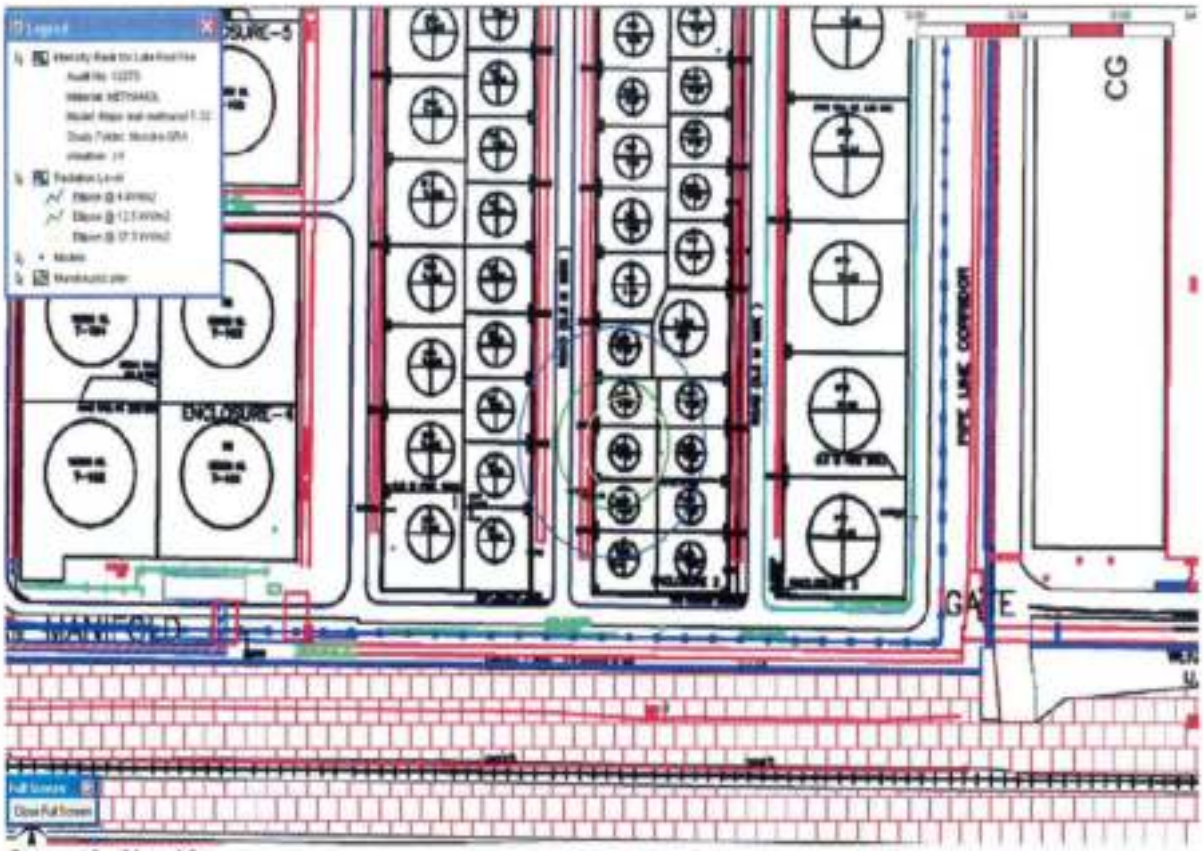
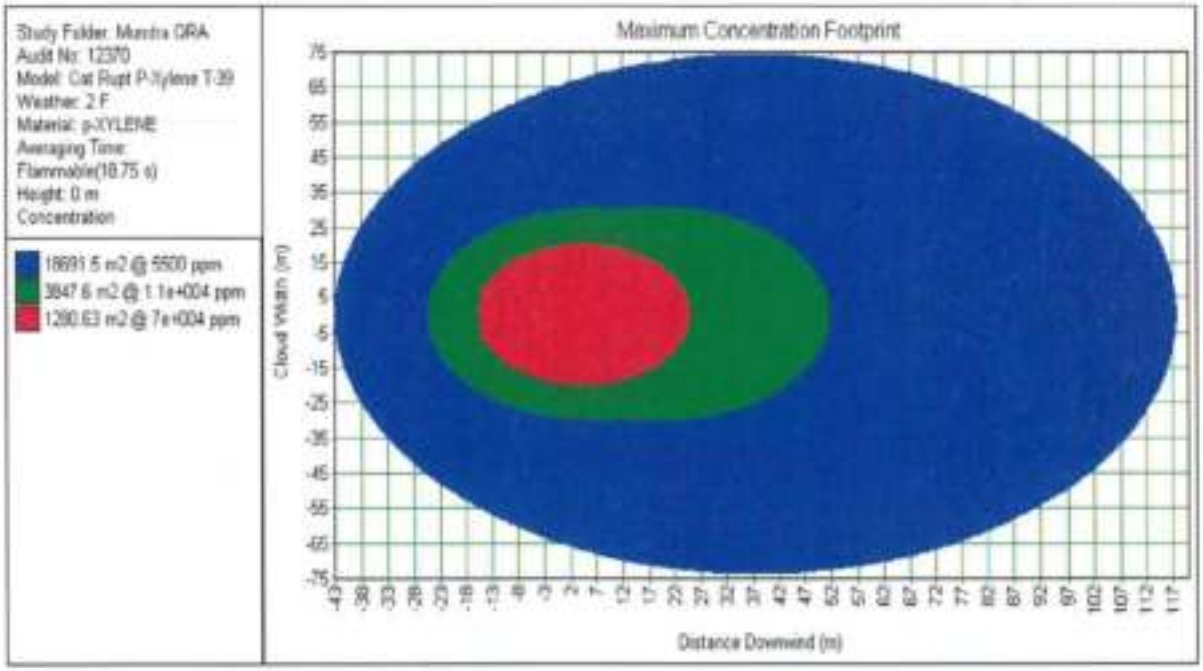
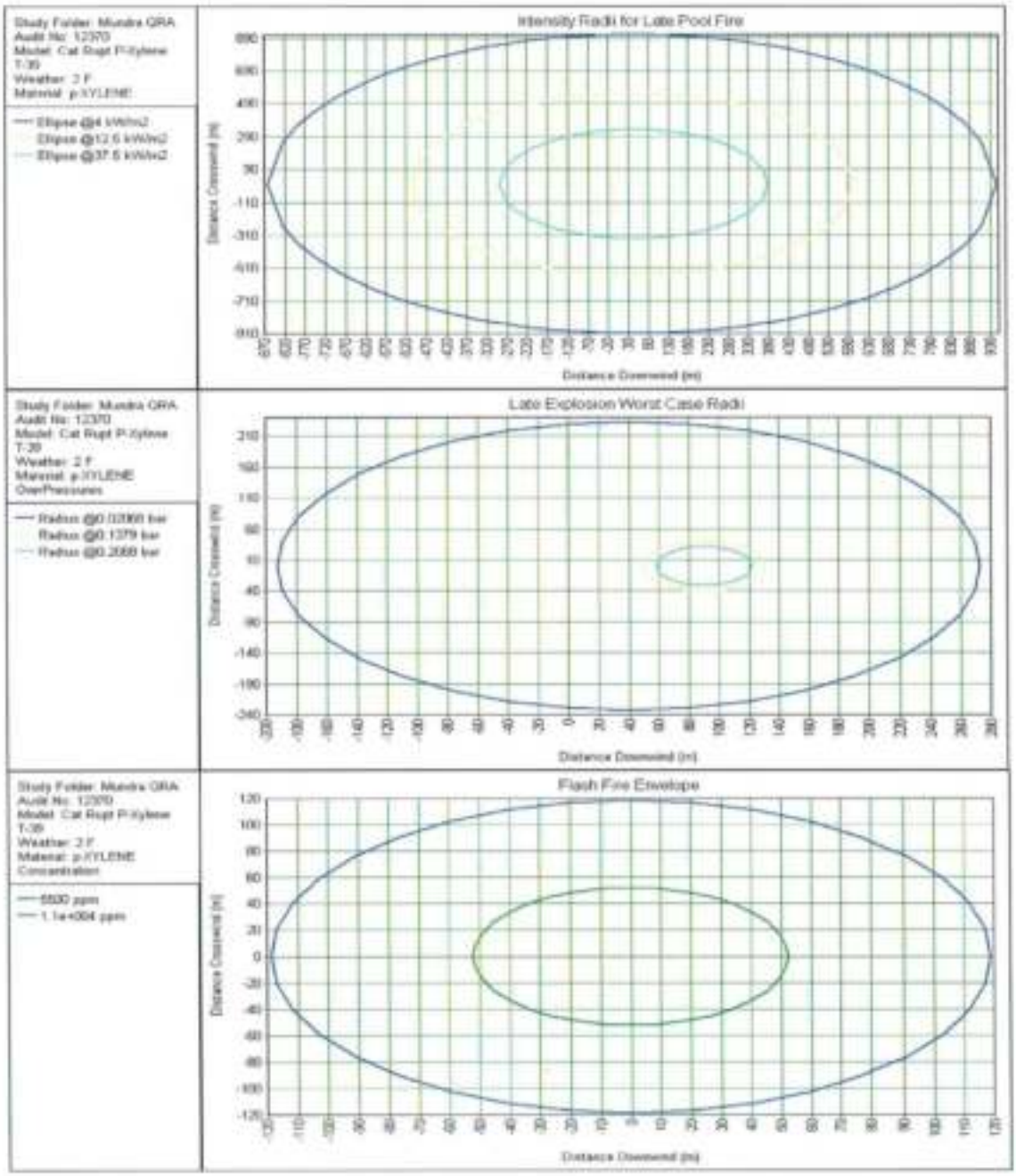


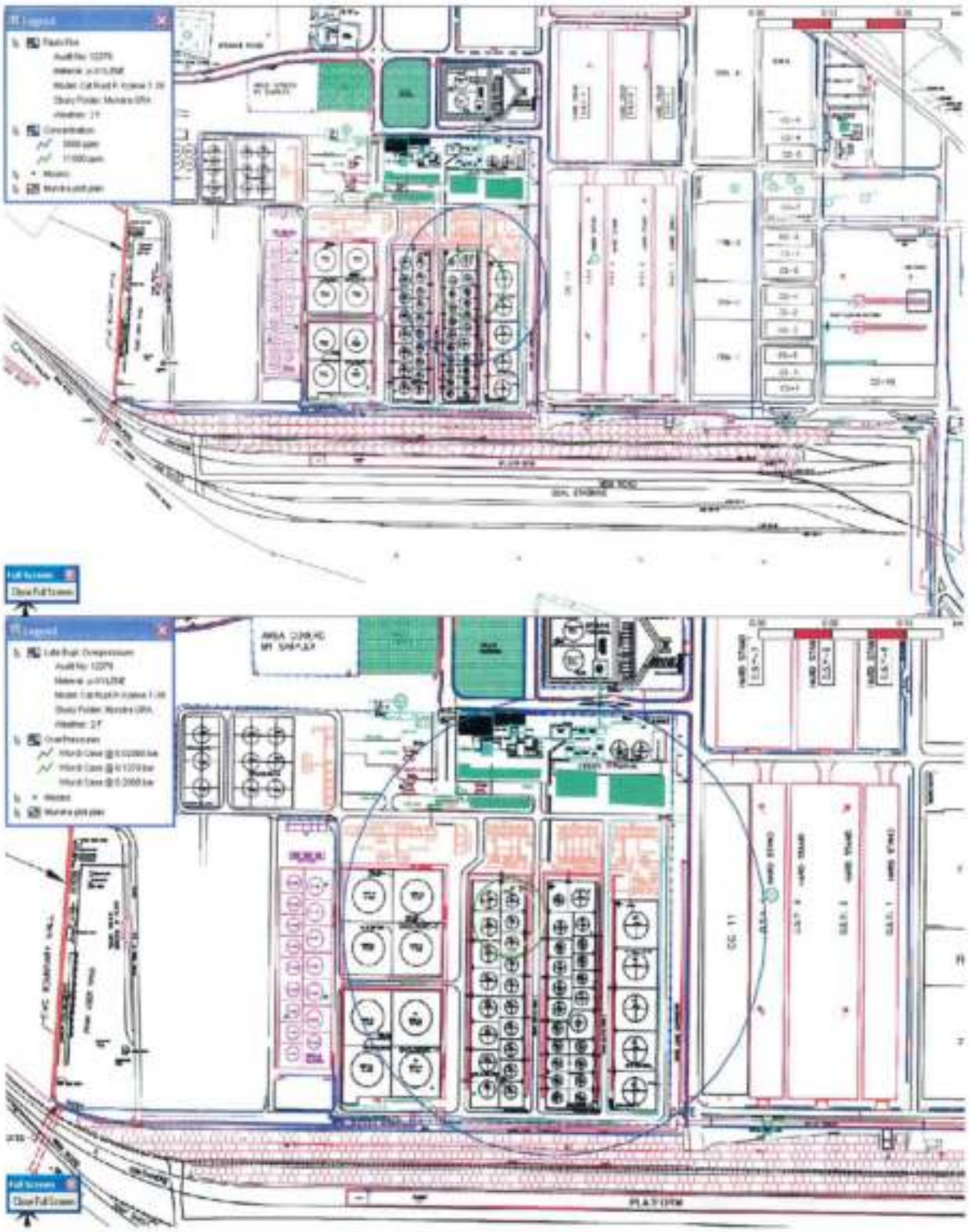

Study Folder: Mundra QRA
Audit No: 12370
Model: Major leak methanol T-32
Weather: 2 F
Material: METHANOL
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Intensity Radii for Pool Fire
Distance Crosswind (m)
Distance Downwind (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Major leak methanol T-32
Weather: 2 F
Material: METHANOL
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Ellipse @37.5 kW/m2
Intensity Radii for Late Pool Fire
Distance Crosswind (m)
Distance Downwind (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Major leak methanol T-32
Weather: 2 F
Material: METHANOL
Concentration
3.65e+004 ppm
7.3e+004 ppm
Flash Fire Envelope
Distance Crosswind (m)
Distance Downwind (m)

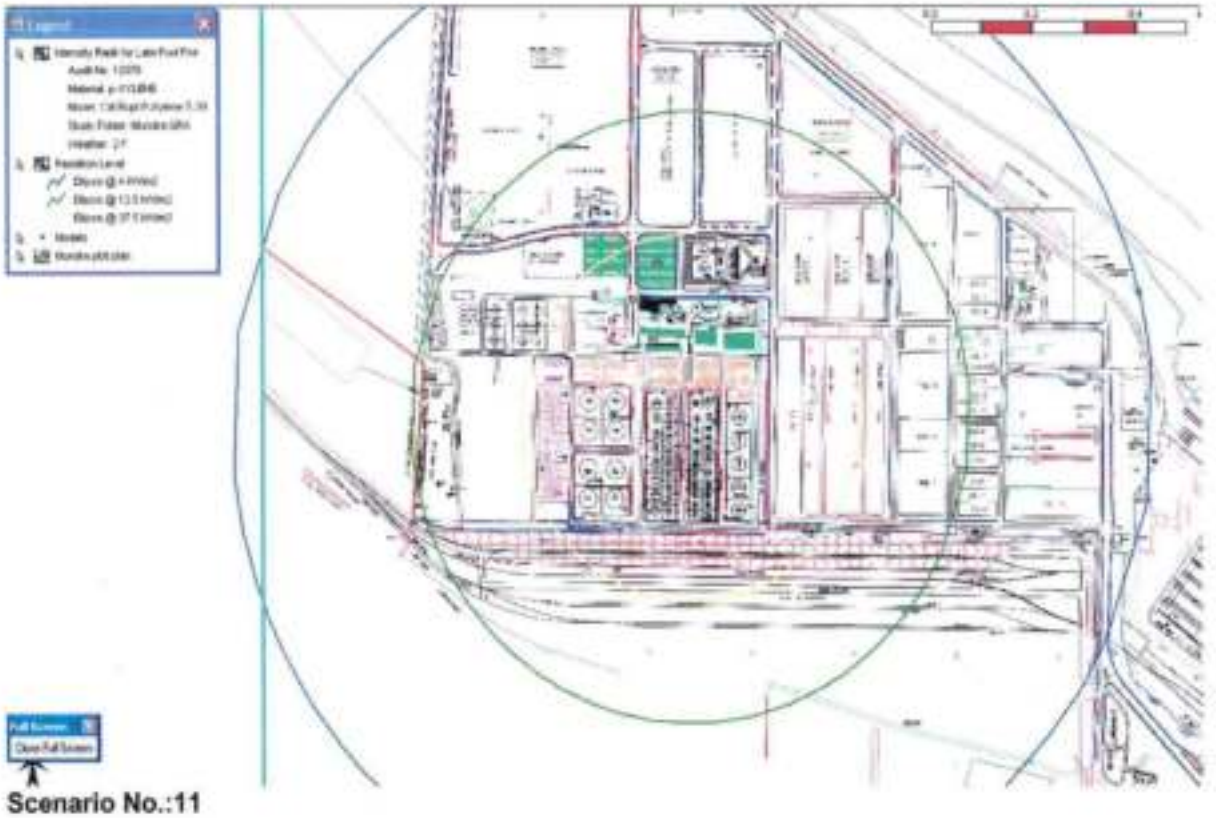


Scenario No.:10




Intensity Radii for Late Pool Fire
Late Explosion Worst Case Radii
Flash Fire Envelope





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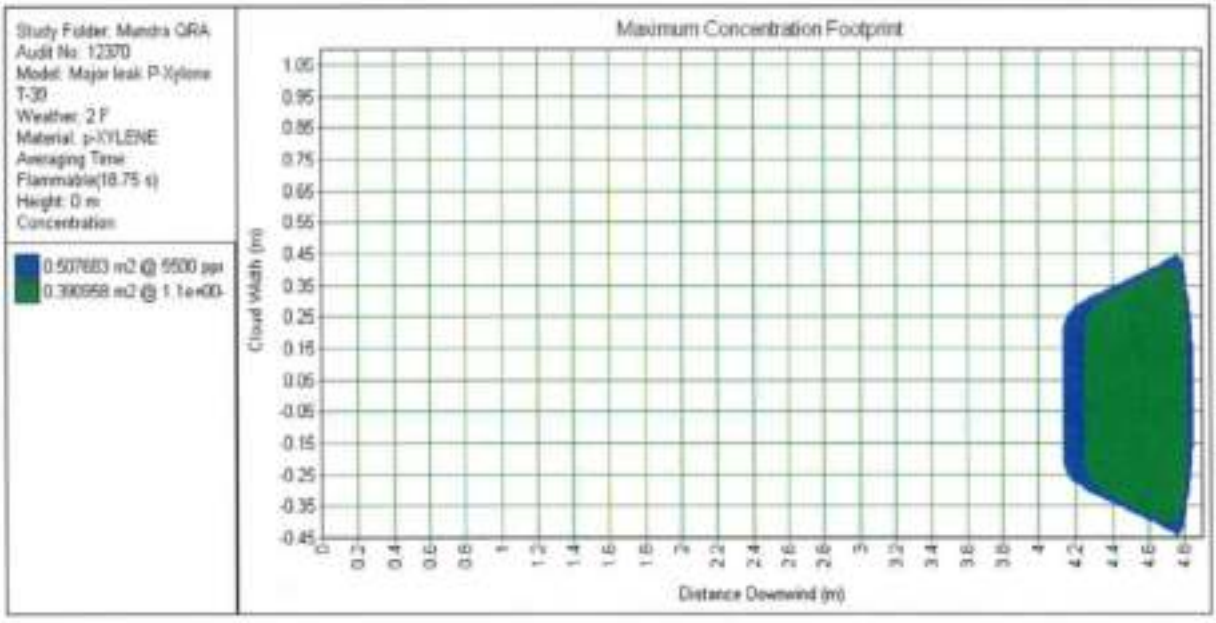
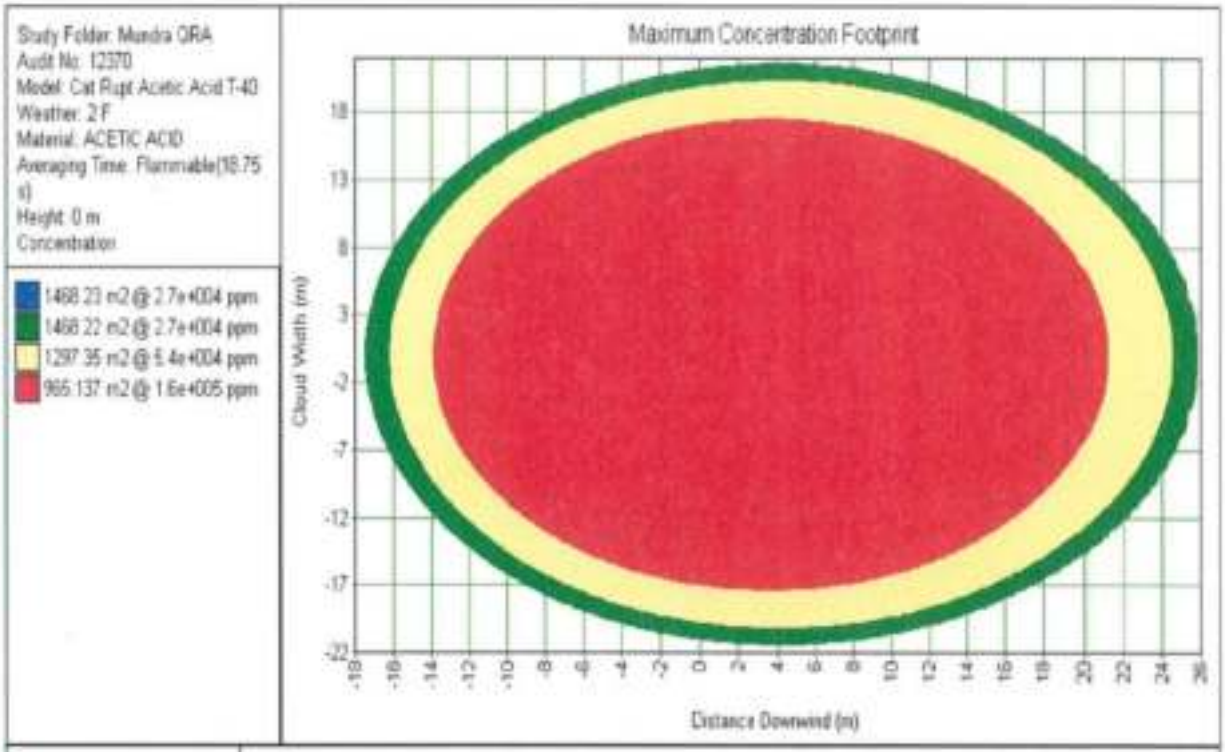
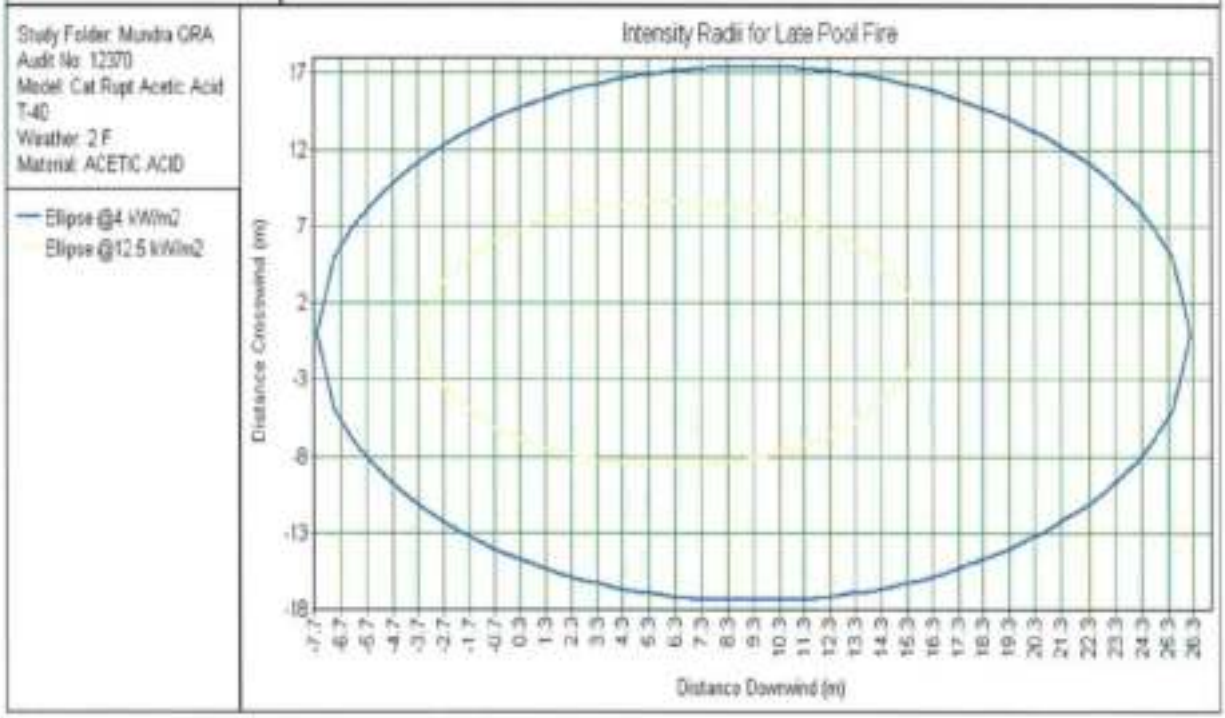


Scenario No.: 4





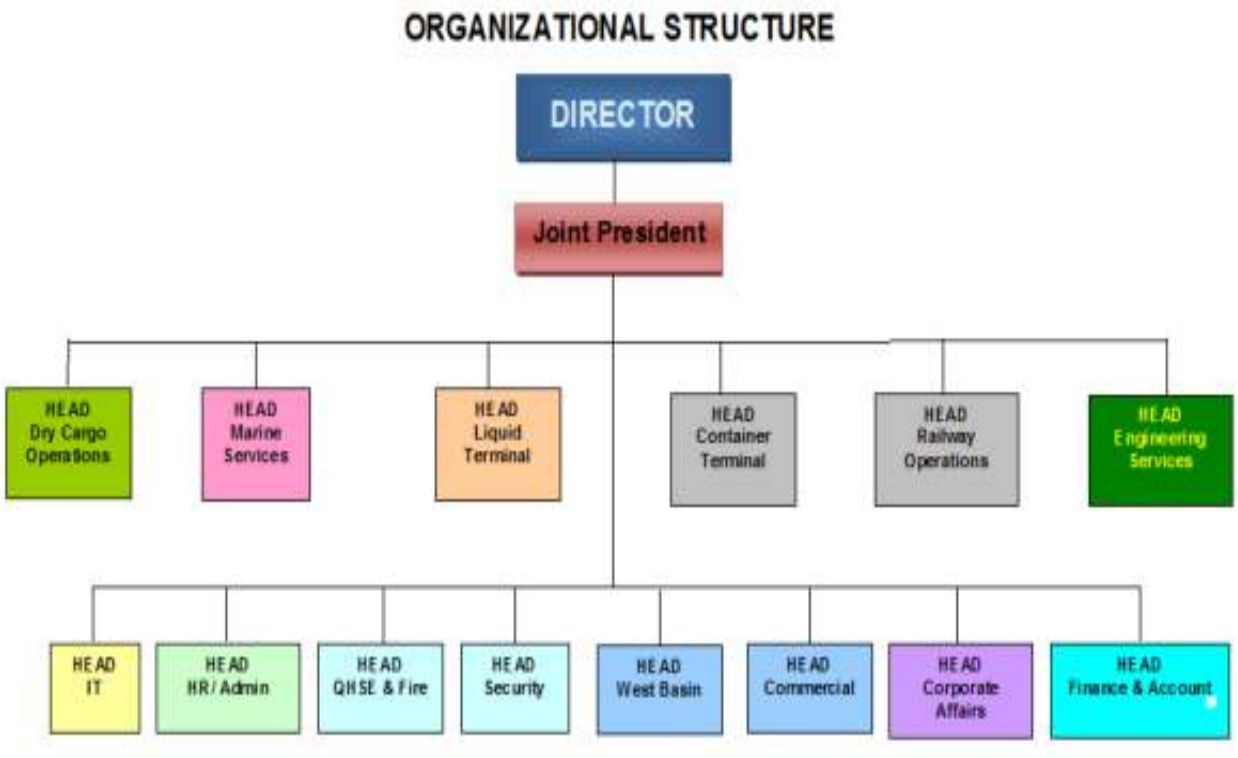
CHAPTER NO. III

ABOUT EMERGENCY ORGANISATION

CONTENTS

3.0 EMERGENCY ORGANIZATION

Emergency organization is the main aim behind preparing this plan. Due weight is added to select and assign suitable responsibilities to the most appropriate persons of the **Adani Port, Mundra** from respective departments. Care is taken to earmark emergency duties from their day-today responsibilities. The organization shall prove effective if activities are carried-out in a defined way. To get maximum advantage of emergency organization, we have defined the activities of various workers in the following way.



TERMS	DEFINITION
Emergency Control Center	In the event of an emergency, Port Operation Center has been declared as Emergency Control Center (POC). Port Operation Center (POC) is situate at Marine Control, **Adani Ports & SEZ Ltd**.

Coordinator	HOD or senior most functionaries in the respective services and other critical personnel available at site at the time of an emergency. They will report at the Emergency Control Center, unless and otherwise instructed by the site main controller.
Plant Key Person	Head of Department of individual process plant(s). {Should assume charge of Site Incident Controller in case of an emergency in their respective plant(s)}.
Non-Essential Personnel	Consists of employees, contractor's employees, visitors etc. (other than emergency response personnel) present at the incident site. In the event of an emergency, these persons shall assemble at the emergency assembly point of the plant/ area and shall respond as instructed by the site incident controller.

3.01 SCOPE & PURPOSE

SCOPE :: The very purpose of this plan is to activate the emergency response organization smoothly and effectively, once the emergency is declared. The plan details the arrangements for responding to emergency scenarios, covering in details the following aspects:

- To assess and define emergency including level of risk.
- To contain the incident and bring it under control.
- To coordinate with mutual aid members and Government authorities.
- To minimize damage to lives, property and the environment.
- To rescue and evacuate workers to safe areas.
- To provide necessary assistance to casualties.

PURPOSE :

The purpose of this plan is to:

- Establish & define roles of coordinators, key personnel and other emergency response personnel.

- Establish guidelines for effective response to any emergency.
- Ensure a smooth interface between various emergency procedures and the APSEZ Emergency Action Plan.

For this plan to be effective, it is necessary that:

- Coordinators, key personnel and other emergency response personnel are familiarized with this action plan.
- On-site resources are mobilized in minimum time.
- Assistance from outside agencies is readily available.
- The drills for identified emergencies are regularly exercised.
- The emergency responses are reviewed and updated based on latest developments, other information and requirements in order to improve effectiveness of the APSEZ – EAP.

3.02 THE NEED OF DISASTER PLANNING AT APSEZ (Port Area)

Disaster at The Port : A major emergency in Port is one, which has the potential to cause serious injury or loss of life. It may cause extensive damage to property and serious disruption both inside and outside the port. Sometimes, it would require the assistance of outside emergency services to handle it effectively. Although an emergency may be caused by a number of different factors, viz plant failure, human error, earthquake, Cyclone, flood, vessel collide, vehicle crash, major spillage or sabotage, it will normally manifest itself in three basic forms viz - Fire, Explosion or toxic release.

Need of Disaster Planning : In spite of universal acceptance of excellent codes of practices for design and operation of plants and storage, there have been occurrences of a number of losses due to major incidents of varying degree of severity. In fact, no industrial plant or office and no commercial or mercantile organization can be totally immune from disaster. These disasters could be attributed to various causes including failure of adherence to codes of practice. The first few minutes after an emergency situation occurs are generally the most critical. The wrong action or a few seconds delayed action in crises can make all the difference. A quick and effective response at that time can have tremendous significance on whether the situation is controlled with little loss or whether it turns into a disaster. Contingency planning increases thinking accuracy and reduces thinking time in an emergency, which reduces loss. The effectiveness of what we should do if disaster strikes will depend upon how well we have prepared the contingency plans and trained the people who will have to implement them. Even if the plans generated and equipment provided are never used, the very fact that the

plans have been developed and equipment have been provided creates confidence among employees and from an economic point, may reduce the insurance rates. The Social and legal consequences of ―Bhopal‖ Gas Tragedy have sufficiently demonstrated that these considerations alone are important enough to persuade management of hazardous plants to develop suitable plans. Thus disaster is a situation generally arising with little or no warning and causing or threatening death, injury or serious disruption to people and services which cannot be controlled, by fire, police and services operating alone. The incident will require special mobilization and co-operation of other bodies and voluntary organization.

3.03 EMERGENCIES - CLASSIFICATION OF EMERGENCES

Different types of emergencies that may arise at the Port can be broadly classified as:

a) Nature – I (On – Site Emergency) – It can be further subdivided into two levels:

Level – I The emergency is perceived to be a kind of situation arising due to an incident which is confined to a small area and does not pose an immediate threat to life and property and this can be handled with resources available within premises.

Level – II The emergency is perceived to be a kind of situation arising due to an incident which poses threat to human lives and/ or property, having potential to affect large area within the factory premises. This kind of situation is beyond the control of internal resources and requires mobilization of additional resources from other sections/ departments and help from outside agencies. The situation requires declaration of On – Site emergency.

b) Nature – II (Off – Site Emergency)

The emergency is perceived to be a kind of situation arising out of an incident having potential threat to human lives and property not only within Port but also in surrounding areas and environment. It may not be possible to control such situations with the resources available within APSEZ. The situation may demand prompt response of multiple emergency response groups as have been recognized under the District Emergency plan for Kutch. A similar situation in neighboring industry that may affect The Port Area and also falls under this category.

POTENTIAL EMERGENCIES

Sr. No.	Emergencies
1.	Cyclonic Storm/ Hurricane
2.	Earthquake
3.	Tsunami
4.	Flood
5.	Industrial unrest
6.	Bomb Threat
7.	War
8.	Food/ Water Poisoning
9.	Fire , Transportation Incidents involving Hazardous Materials
10.	Major Release of Flammable/ Toxic Chemicals
11.	Major Release of Flammable/ Toxic Gases
12.	Transportation Incidents involving Hazardous Material
13.	Marine Emergency

3.04 EMERGENCY RESPONSE ORGANIZATION

For control of an emergency, **Adani Port - Mundra** has established an emergency response organization headed by **COO (alternate – next Sr. Officer In-charge),** who shall be the Site Main Controller. This emergency response organization will provide the command and control structure to coordinate and direct the response to an emergency, and depending on the circumstances of the emergency will consists of:

Management Team

Director / CEO / COO (Site Main Controller)
QHSE – HOD or senior most functionary of the department
Site Incident Controller – HOD or senior most functionaries available at site
Deputy Site Incident Controller – Section Head

Primary Support Team

Coordinators (HOD or senior most functionaries)

–Fire Services
–QHSE
–Security Services
–Occupational Health Center
–Engineering Services
–Human Resource
–Administration

Secondary Support Team

Coordinators (HOD or senior most functionaries)

- **Finance & Accounts**
- **Commercial**
- **Administration (Transport Cell)**
- **Administration (Welfare & Canteen)**
- **Corporate Communication**

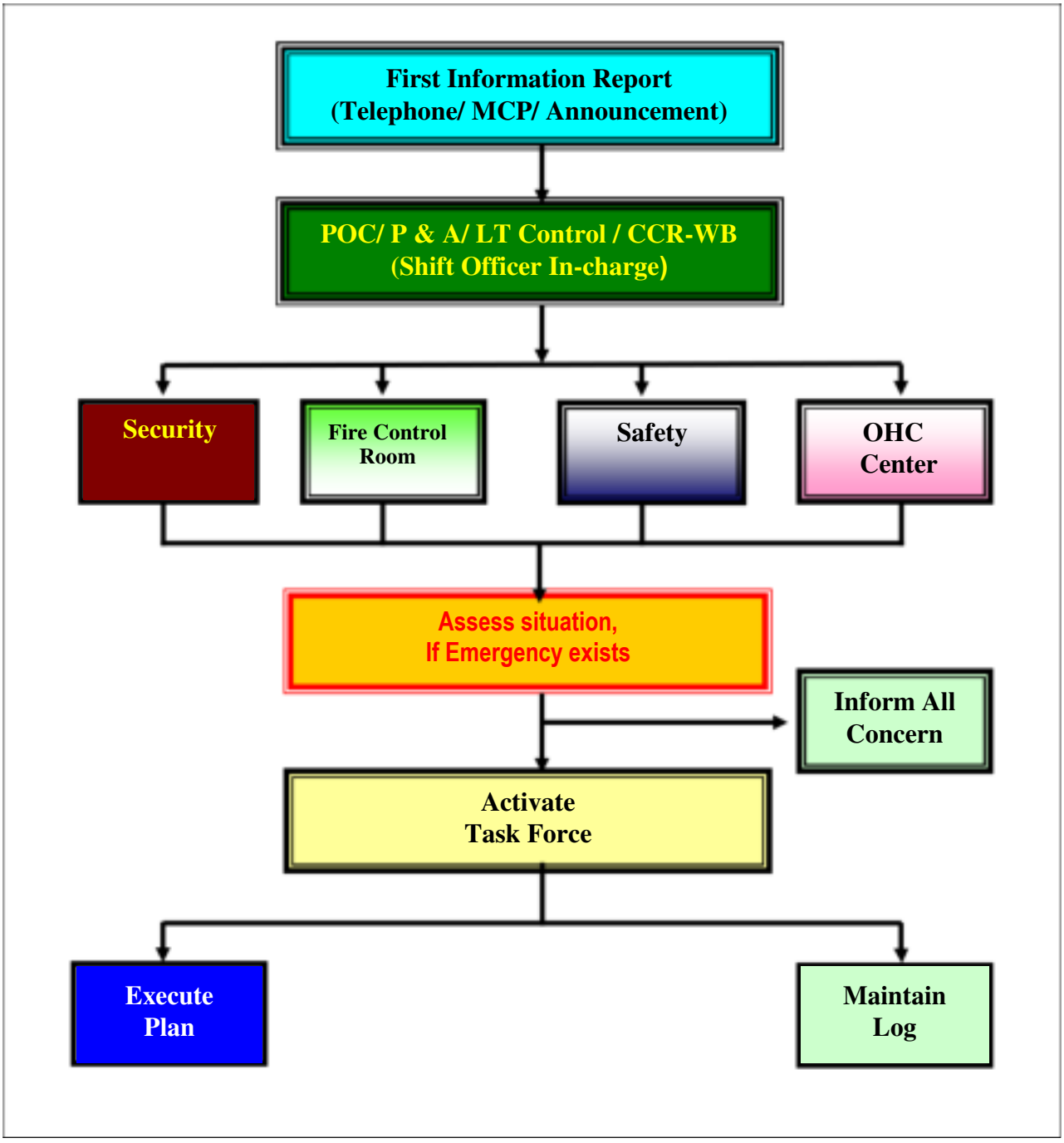
Only Site Main controller can activate the emergency response organization. An Emergency Control Center has been established in the office of Site Main Controller (Alternate – Conference Room – POC).

The primary role of the emergency response organization in an emergency shall be:

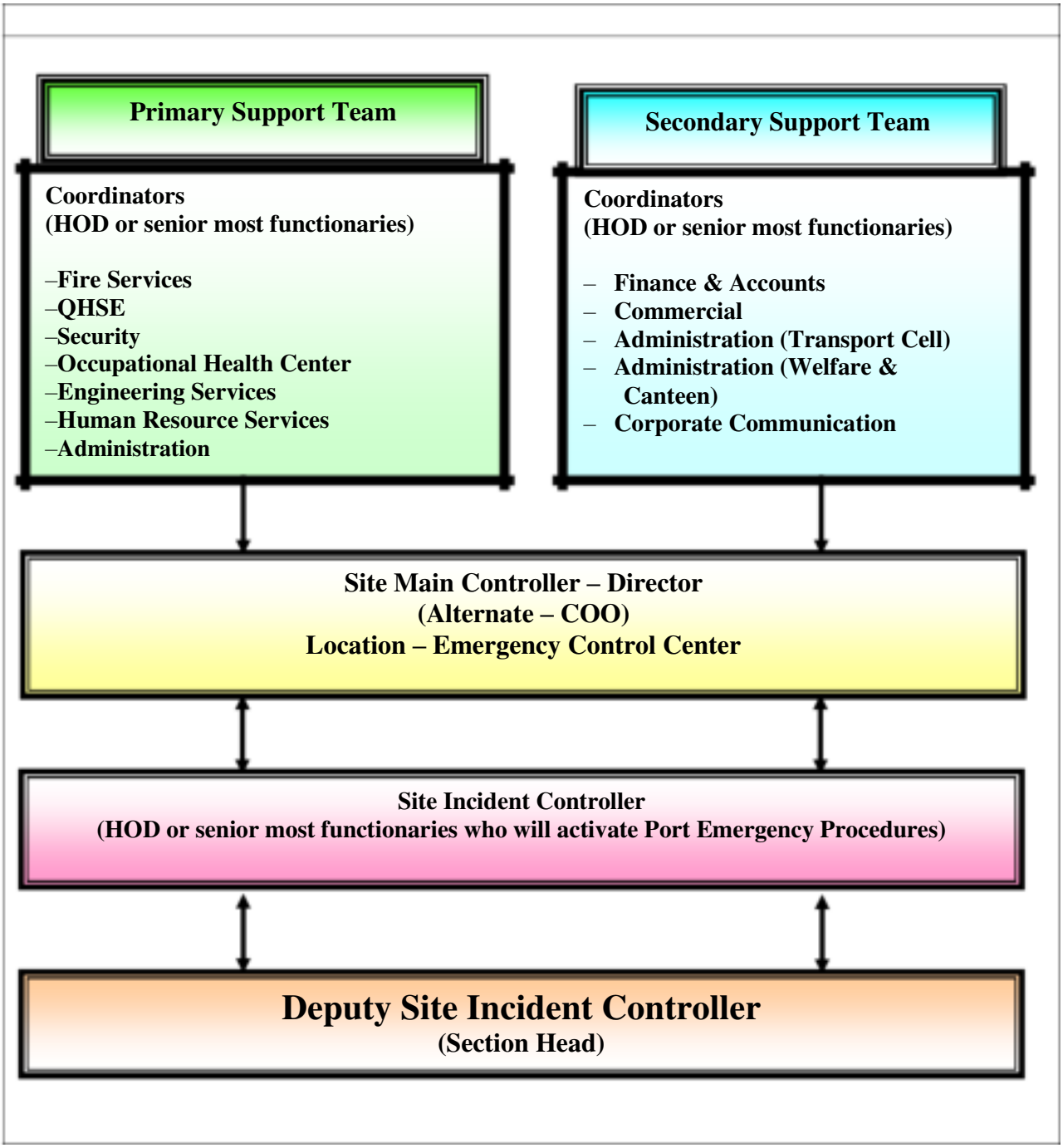
- Determine the degree to which the emergency response organization shall be activated.
- Determine extent of actual action required, organize and render assistance to Site Incident Controller.
- Coordinate with all other concerned.

Emergency Reporting Line is as outlined in **Chart B**.
Emergency Task Force is as outlined in **Chart C**.
Emergency Assembly Points are as outlined in **Chart D**.

3.05 EMERGENCY REPORTING LINE



EMERGENCY TASK FORCE



3.06 ASSEMBLY POINTS

ASSEMBLY POINT	
 EMERGENCY ASSEMBLY POINT	
Port Emergency Assembly Points	
PORT AREA	
ZONE	**AREA**
ZONE – 1	Marine House
ZONE – 2	CG–7
ZONE – 3	Driver Canteen
ZONE – 4	Old Administration Canteen
ZONE – 5	Railway Building (R & D Yard)
ZONE – 6	Terminal – 2 (Security Gate)
ZONE – 7	Container Terminal - 2 (Security Gate)
ZONE – 8	Main Gate
ZONE – 9	Port User Building
ZONE – 10	Adani House
ZONE – 11	Terminal – 03 (Security Gate)
ZONE – 12	South Basin (Security Gate)
WEST BASIN AREA	
ZONE – 1	SS-1
ZONE – 2	PMC Office
ZONE – 3	GIS (Near DG House)
ZONE – 4	Main Gate
ZONE – 5	Approach - 03
ZONE – 6	Amenities Building
Non-essential personnel shall assemble at Emergency Assembly Point as announced by Site Incident Controller.	

3.07 CATEGORIES OF EMERGENCIES

The general action plan to deal with:

- Emergencies (Category wise) are as outlined in **Chart –E.**
- Emergencies (Occurrence - with due warning) are as outlined in **Chart –F.**
- Emergencies (Occurrence – sudden) are as outlined in **Chart –G**.

EMERGENCIES CATEGORY WISE

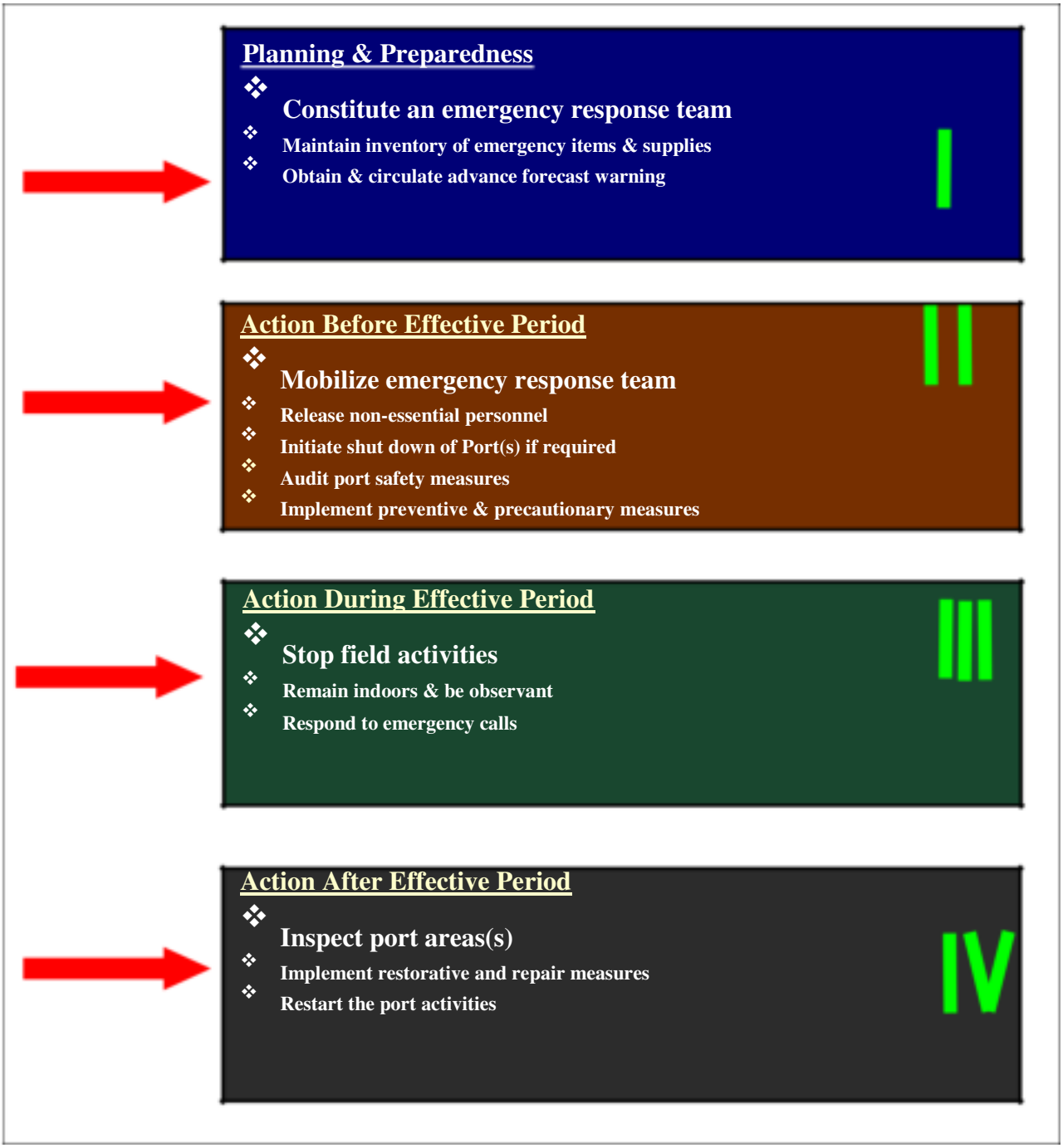
Emergencies (Occurrence – with due warning)

- **Cyclonic Storm/ Hurricane**
- **Earthquake**
- **Flood**
- **Tsunami**
- **Industrial Unrest**
- **Bomb Threat**
- **War**

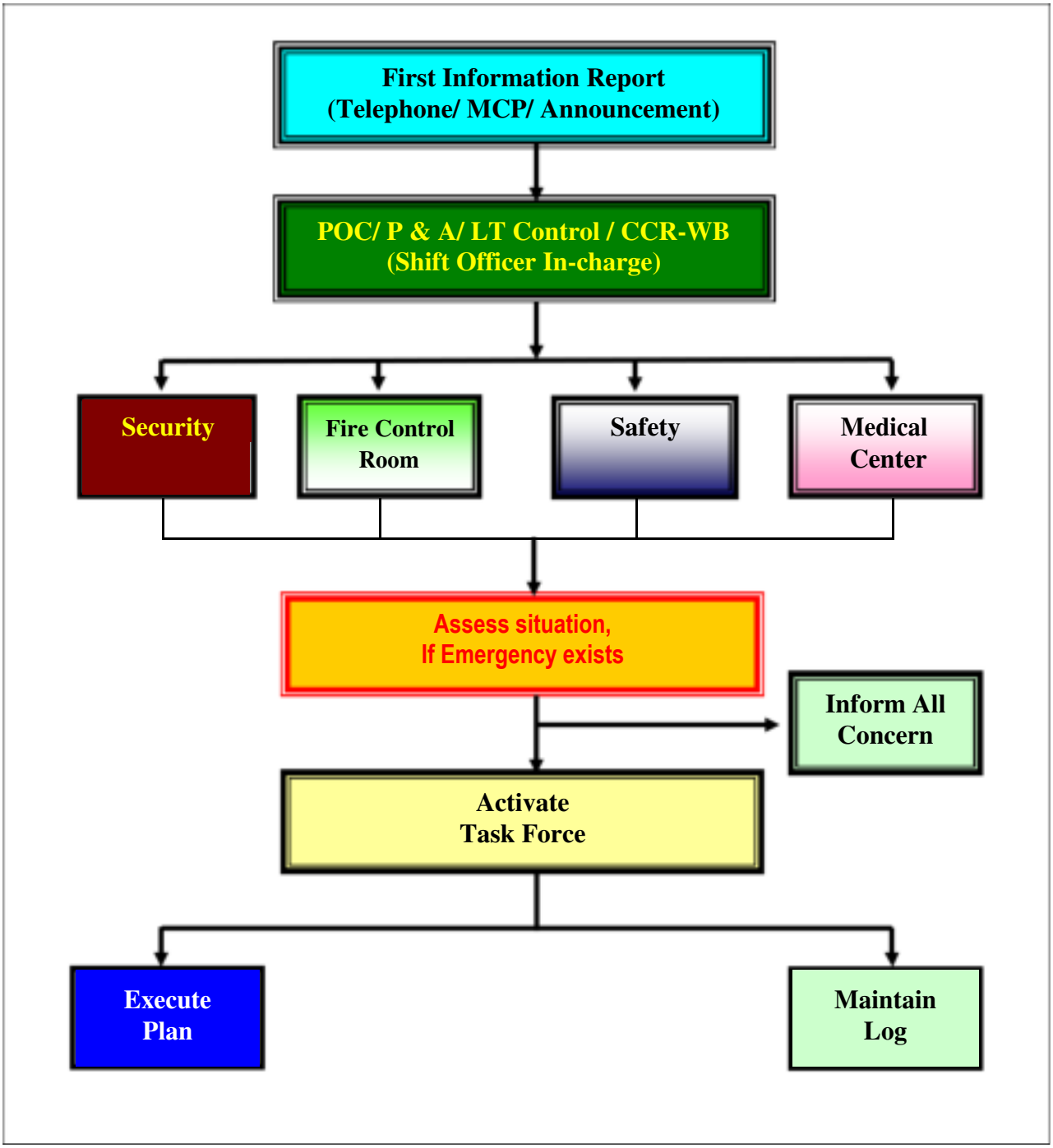
Emergencies (Occurrence – without warning)

- **Food/ Water Poisoning**
- **Fire**
- **Major Release of Flammable/ Toxic Chemicals**
- **Major Release of Flammable/ Toxic Gases**
- **Transportation incidents involving Hazardous Materials**
- **Marine Emergency**

GENERAL ACTION PLAN – EMERGENCIES (OCCURRENCE – WITH DUE WARNING)



GENERAL ACTION PLAN – EMERGENCIES (OCCURRENCE – WITHOUT WARNING / SUDDEN)



3.08 DUTIES & RESPONSIBILITIES

3.8.1 Site Main Controller :

- Has overall responsibility for the conduct of all emergency operations within the port complex.
- Shall immediately assess the situation plus its consequences, formally declare the level of emergency and order appropriate action.
- Shall direct all emergency operations within the port premises with the following priority:
  - Safety of personnel, property and equipment
  - Pollution and environmental impact control
  - Damage and loss control
  - Minimum curtailment of port activities
- Shall ensure all possible assistance to personnel affected for medical attention and hospitalization as appropriate.
- Shall ensure that all local and statutory authorities are kept advised of the facts and status.
- Shall ensure that normalcy is declared only when considered absolutely safe to do so.
- Shall be responsible for making available all possible company resources for emergency operations within Mundra Taluka and Bhuj District, if required/ requested by the appropriate Government Authority or ―Mutual Aid‖ organization.

3.8.2 Site Incident Controller

- Shall immediately assess the scale of emergency and report to Site Main Controller for instructions/ directions.
- Shall be responsible for operations in affected area with priorities as under:
  - Safety of personnel, property and equipment
  - Pollution and environmental impact control
  - Damage and loss control
  - Minimum curtailment of port activities
- Shall liaise with other heads of department for their support and assistance.
- Shall ensure continual reporting of situation to Site Main Controller and shall recommend calling for external resources as appropriate.

3.8.3 Emergency Support Officers

- Shall report to Site Incident Controller immediately and assist him as required (all possible portable emergency equipment, resources and personnel to incident location).
- Shall liaise closely with Head- Administration to facilitate the transfer of equipment, resources and personnel to incident location as appropriate.

3.8.4 Emergency Support Officers (Cont.)

- Shall carefully evaluate the risks, effects and possible consequences of:
  - the incident to his area of responsibility and propose further course of action to the Site Incident Controller with particular concern about safety of personnel, protection of environment and control of operation
- If the emergency situation involves Railways (locomotives, tracks and/or sidings), shall inform the Area Manager of Western Railways for assistance and mobilization of the Railways Emergency Team.

3.8.5 HOS – Administration (Transport Cell, Welfare & Canteen)

- Shall report to Site Incident Controller immediately and assist him as directed.
- Shall coordinate the activities of administration units.
- Shall inform and liaise with local bodies and authorities and police department in respect of the incident/ emergency.
- Shall arrange for transportation of whatever nature for use in the situation.
- Shall ensure that internal and external communication systems are available.
- Arrange for hot drinks/ snacks/ foods as requires at incident location.
- Shall arrange for assistance, if required from the ―**Mutual Aid**‖ system if available and as directed by Incident Controller.

3.8.6 HOD – Human Resources

- Shall report immediately to Site Incident Controller and assist him as directed.
- Shall ensure Assembly Points are manned and all persons reporting there properly identified.
- Shall arrange to record full details of all persons affected by the incident and to inform next of kin as appropriate.
- Shall arrange for the transfer of all affected persons to suitable places for first aid or further medical attention as appropriate.
- Shall arrange for the evacuation, from the location of incident of all personnel not essential.
- Shall arrange to depute company personnel to each location where affected persons are being treated or are gathered for whatever reasons, to render assistance.
- Shall arrange to keep regularly informed of status and facts pertaining to incident to the families of company personal in its residential area.
- Shall inform to Government Authorities (DISH, GPCB etc.)
- Liaison with Government Authorities (DISH, GPCB etc.)

3.8.7 HOD – Corporate Affairs

- Shall report immediately to Site Incident Controller and assist him as directed.
- Shall assume the role of Public Relation Officer (PRO) for communication, dissemination of information, status and facts (preparation of communiqués, statements etc.) Shall co-
- ordinate with business related statutory and Government organization.

3.8.8 HOD – Engineering Services

- Shall report immediately to Site Incident Controller and assist him as directed.
- Shall ensure activation of departmental damage limitation activities.
- Shall ensure immediate electrical isolation of the incident location thereafter; arrange availability of power after ascertaining safety of doing so.
- Shall make available all support that may be possible for the extrication/ evacuation of persons from the affected area.
- Shall liaise with the Engineering Services of organizations in close neighborhood for sourcing of supplemental equipment resources and assistance.
- Shall depute all available personnel to assist administration department.

3.8.9 HOD – Commercial

- Ensure availability of materials required by the Site Incident Controller.
- Issue materials from central stores round-the-clock (if required).
- Arrange emergency procurements from local dealers/ vendors or from neighboring industries.
- Arrange transportation of materials from central stores to the site of incident in coordination with the Coordinator (Transport Cell).

3.8.10 HOD – Finance & Accounts

- Shall report immediately to Site Incident Controller and assist him as directed.
- Shall ensure availability of funds and cash for all emergent requirements.
- Shall depute all available department personnel to assist HR in their activities.
- Shall ensure that under writers, shareholders, lenders, bankers and other Financial Institutions and statutory bodies are kept advised of the situation as appropriate.

3.8.11 HOD – Security

- Close the visitors' gate.
- Instruct the security to occupy pre-determined post for controlling security of installation.
- Call up additional help from Barracks.
- Ensure that unauthorized persons / vehicles do not enter the gate.

3.8.12 HOD – Security (Cont.)

- Ensure that unauthorized persons / vehicles do not enter the gate.
- Provide security men for firefighting & rescue.
- Arrange for transport of higher authorities to the terminal.
- Transport vehicles would be provided near emergency control center.
- Depute two security guards for controlling traffic at scene of disaster.
- Produce a list of port staff on duty in co-ordination with time office.
- Ensure availability of security men at gates so that they can lead authorities to disaster site.
- Ensure that non-essential persons do not crowd affected area.

3.8.13 HOS – Fire Services

- He will report to Site Incident Controller and has the single motive – concern for safety of personnel during emergency response operations. He will normally function as an advisor to the Site Incident Controller.
- He will not be directing any activity, issuing or relaying orders/ information.

3.8.14 HOD/ HOS – Safety

- Report at Emergency Control Center and assist Site Main Controller with necessary information, support and resources.
- Mobilize off-duty personnel for assistance.
- Coordinate with the Coordinator – Commercial to mobilize additional resources, viz. spill containment equipment/ firefighting equipment/ personal protective equipment, spare breathing air cylinders etc., as may be required at the site of incident.

3.8.15 HOS – Occupational Health Center

- Contact Site Main Controller. Report at Emergency Control Center or at Occupational Health Center as instructed by the Site Main Controller.
- Organize first aid arrangements for the affected persons at the site of incident (cold zone) as may be necessary.
- Ensure that adequate paramedical staff, equipment and medicines are available at the Occupational Health Center. Mobilize additional resources (if necessary).
- Liaise with the local medical authorities and city hospitals, if the casualties are high and situation demands external medical help.
- Coordinate with the Coordinator - Transport for transporting victims to various hospitals.

3.09 EXTERNAL AID

In case of an emergency, which poses threat to human lives or/ and property, within **Adani Port - Mundra** as well as in the surrounding neighborhood areas, it may not be possible to control such situations with the resources available at APSEZ. In such situations, additional resources are mobilized from other agencies, which include:

- Neighboring Industries (Mutual Aid Members)
- Government Authorities

External Aid Providers are as outlined in **Chart H**.

Note: Agreement is under process.

3.10 MUTUAL AID MEMBERS

Adani Port has entered into an agreement for mutual aid with following units for help/ assistance in the event of an emergency.

- Indian Oil Corporation Limited,
- Hindustan Petroleum Corporation Limited,
- Jindal SAW Ltd. (IBU),
- Adani Power Limited,
- Costal Gujarat Power Limited,
- Hindustan Mittal Energy Limited

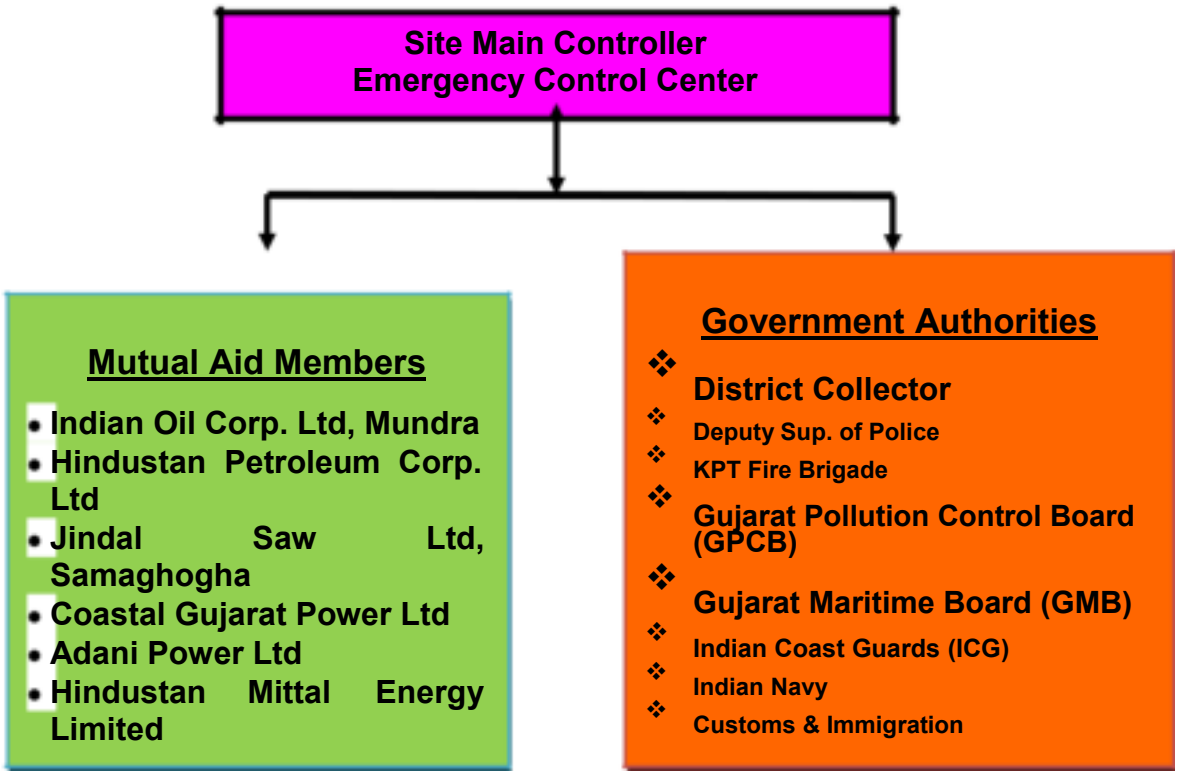
The mutual aid members shall:

- Respond promptly to the emergency call as and when communicated.
- Send their fire tenders/ crewmembers along with necessary supplies/ materials at the site of incident (as requested) and report at the **Adani Port** Security Gate and get instructions from security personnel on duty. These resources and personnel shall be deployed as directed by Site Incident Controller.
- The crew in–charges of the mutual aid members shall be responsible for safety of their crew engaged in emergency operations.

3.11 GOVERNMENT AUTHORITIES

If the situation demands response from multiple groups/ teams, APSEZ may seek assistance from various Government Authorities as have been recognized under the District Disaster Management Plan. These may include:

- District Collector
- Fire Brigade
- Police Commissioner
- Gujarat Pollution Control Board (GPCB)
- Gujarat Maritime Board (GMB)
- Indian Coast Guards (ICG)
- Indian Navy
- Immigration & Customs



3.12 REPORTING & INVESTIGATION

REPORTING :: Any incident (whether minor or major) shall be reported. The main objective of incident reporting is to:

- Provide first-hand information to all the concerned
- Initiate investigation
- Prepare failure analysis report
- Report to the Government authorities (if required)

References

- Procedure for Incident Reporting
- Incident Report Format
- Work Injury Report

INVESTIGATION : All incidents (whether minor or major) shall be investigated. The main objectives of incident investigation are to:

- Identify the root cause(s) of the incident.
- Take appropriate preventive measures to prevent recurrence.
- To comply with the statutory requirements.

References

Incident Investigation Procedure

3.13 COMMUNICATION & PUBLIC AFFAIRS

COMMUNICATION : Communication, an integral part for handling any emergency, helps in taking quick decisions, efficient & effective control of the emergency. Communication between the Emergency Control Center & the Field Command Post is established by means of:

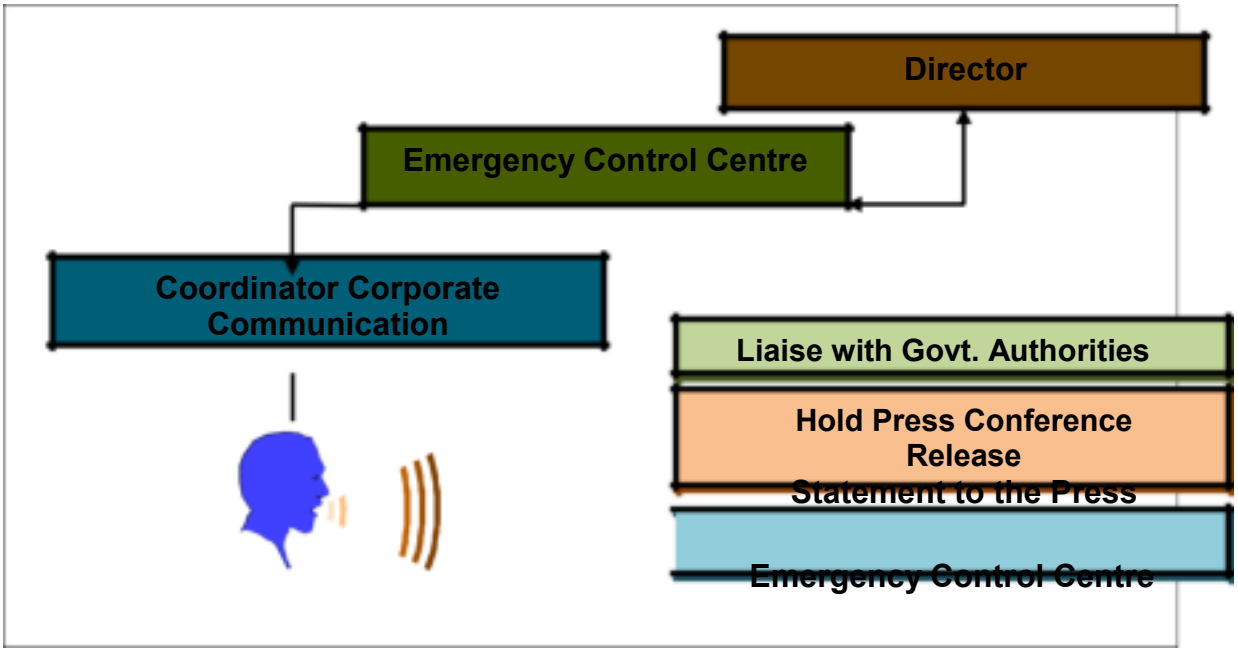
- Telephone
- Mobile
- Port Announcement System
- Wireless VHF / UHF Radio
- E – Mail

- Emergency Vehicle

Communication between the Emergency Control Center and external authorities will be by:

- Telephone
- E – Mail
- Fax
- Emergency Vehicle

3.14 PUBLIC AFFAIRS



CHAPTER - 4

EMERGENCY PLANNING

4.01 DRILLS & TRAINING

Emergency response drills are conducted once a month to ensure effective response by not only the staff within **Adani Port** complex but also by external aid members (as required). The participation & actions will depend on the level of emergency drill planned, as per following table:

Drill	Duration	Port Level	Complex Level	District Level	Frequency	Notes
Siren Testing Drill	1 Minute	X	--	--	Twice in a Month	Test communication, check availability of personnel and evaluate response time.
Emergency Response Drill	1 – 2 hours	--	X	--	Monthly	Consists of interactive discussions of a simulated scenario among members of emergency response team but does not involve mobilization of personnel & equipment

4.02 TRAINING

The importance of training to personnel involved in responding to any emergency scenario is recognized and acknowledged. The training to employees at APSEZ is as per following table:

Course	Duration	New Recruit	Existing Staff	Frequency	Notes
Induction Training	4 Days	X	--	On joining the organization	All employees on joining the organization shall undergo the training at Learning Center

4.03 EMERGENCY PLANS

INDIVIDUAL PLANS ARE REQUIRED TO DEVELOP EMERGENCY PLANS AS PER GUIDELINES PROVIDED IN SAMPLE PLANS

4.3.1 CYCLONIC STORMS / HURRICANE

Cyclonic storms/ hurricanes are intense depressions, which develop in tropical latitudes and are often the cause of very high winds and seas. The wind blows around the center of a tropical storm in a spiral flow inward, anti-clockwise in Northern Hemisphere and clockwise in Southern Hemispheres. Plan for tackling cyclonic storm/ hurricane can be broadly divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** ❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01) Note ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ **Maintain inventory of emergency items & supplies as necessary, including but not limited to:** ❖ Torches, Ropes, lines, wires, tarpaulins, plastic sheets, Tool kit, duct tapes, assorted gears, First aid box, Sand bags etc. Note ➢ The list is subject to updating depending on the requirements of the individual plant. ❑ **Liaise with HOD – ES for Civil & Mechanical Support (including supply of spares).** ❑ **Liaise with HOD – HR for food stock, water, blankets & bedding and medicine.** ❑ Liaise with Port Operation Control.

CYCLONIC STORMS/HURRICANE (Cont.)		
Action By		**Activity**
ACTION BEFORE EFFECTIVE PERIOD		

Port Key Person	❑ **Liaise with Site Main Controller** ❑ **Mobilize Emergency Response Team(s).** Note ➢ Members to be briefed about the emergency. ➢ Members to be informed that they may be required to stay at site during & after the emergency. ❑ **Release non-essential personnel.** Note ➢ Port key person reserves prerogative on the release of employees. ➢ Personnel to be briefed on the possible time of return to work. ❑ **Initiate Port shut down based in:** ❖ Consultation with Site Main Controller. ❑ ***Audit Port area(s) for safety measures to ensure that:*** ❖ *Loose items are secured.* ❖ *Electric machinery is covered and protected against water ingress.* ❖ Storm water drains are cleared of any obstructions. ❑ ***Implement preventive & precautionary measures (including but not limited) to ensure:*** ❖ *Inventory of emergency supplies is maintained.* ❖ *Material and equipment that can possibly be damaged by water ingress is elevated.* ❖ *Windows & doors are weather tight.* ❖ *Roof mounted equipment are braced.* ❖ *Material & equipment that cannot be moved are covered.* ❖ Sandbags are placed in doorways where flooding from storm water can occur. ***In flood as consequence of Cyclonic Storm/ Hurricane is anticipated, ensure:*** ❖ *Dyke valves of Hydrocarbon storage tanks are open.* ❖ Oil Spill Management Plan is actuated.

Action By	Activity
ACTION DURING EFFECTIVE PERIOD	
Port Key Person **Emergency Response Team** **Port Key Person**	❑ **Stop** ❖ All field activities. ❖ All permits to work. **Note** ➢ All personnel to be notified against venturing out during effective period. ❑ **Ensure all personnel remain indoor, observant and be alert to:** ❖ Detect any damage to equipment or buildings. ❖ Development of unsafe conditions. **Note** ➢ In case of any emergency warranting immediate response, communicate to Site Main Controller. ❑ **In consultation with Site Main Controller:** ❖ Make all possible efforts to reach the site of incident/ damage. ❑ **Act appropriately to control prevalent incident/ damage**.
ACTION AFTER EFFECTIVE PERIOD	
Port Key Person & Emergency Response Team **Port Maintenance Group** **Port Process Group**	❑ Audit Port area(s) for damage assessment & prepare report ❑ Undertake restorative measures & repairs based on audit report on: ❖ Damaged equipment & buildings. ❖ Unsafe conditions. **Note** ➢ Clearance report to be submitted to Site Main Controller through Port Key Person. ❑ Initiate restart up of the Port.

CYCLONIC STORMS/HURRICANE (Cont.)

Department Wise Emergency Action Plan for Cyclone

Dry Cargo Department	❑ Remove all fine grained cargo stored at open storage yard and store at indoor warehouse. ❑ Secure the fine grained cargo stored at open storage yards with Tarpaulin. ❑ Stop all stevedoring activities, bring all Mobile Harbour cranes to shore, safely park the cranes and down its booms. ❑ Inform all contractors to remove all their equipment from jetty area and safely park at shore, in case of crane down its boom. ❑ Arrest all barge / ship loaders, and Mobile truck loading hoppers at its wheel to prevent horizontal movement due to wind and secure from its top by arranging guy ropes. ❑ Stop loading / unloading of ship and measure the ship cargo quantities along with clients surveyor and communicate Marine Dept. / shipping agencies to take the ship to anchorage area.
Marine Department	❑ In coordination with dry cargo instruct all ship captains to take the ships anchorage. ❑ Stop all activities at jetty area. ❑ Ensure the jetty areas are free from loose and unsecured materials / equipment. ❑ Update all departments about the latest whether conditions. ❑ Ensure TUG's are shored and secured. ❑ Stop SPM operation remove pipes connections from the ship and conform to maintain safe distance from SPM.
Liquid Terminal Department	❑ Stop loading / unloading of ship, take ullage with clients surveyor, detach hose connections with the shipping vessels and communicate Marine Dept. / Shipping agencies to take the ship to anchorage area. ❑ Remove all loose materials and equipment from jetty area. ❑ Stop all activities, remove all tanker Lorries from liquid terminal and do not allow any tanker Lorries to enter the liquid terminal area.

Department Wise Emergency Action Plan for Cyclone	
Container Terminal / RORO Department	❑ Stop loading / unloading of ship take stock of containers along with surveyor, and communicate Marine Dept. / Shipping agencies to take the ship to anchorage area. ❑ Stop all activities and park the RTGC and RMQC at specified location and secure in all respect to prevent horizontal movement and topping. Ensure crane operators come out of crane after safely parking the cranes. ❑ Remove all loose materials and equipment's from Quay area. ❑ Ensure the height of container stock piling safe withstand the wind force, if it unsafe restrict the stock pile height. ❑ Stop trailer loading and remove all trailer from CT and do not allow any trailer to enter CT. ❑ Secure the all cars stationed at buffer yard by putting blocks on all the wheels.

Security Department	❑ Close the gate ant stop allowing visitors and transport trucks either inward or out ward. ❑ Ensure vehicles are parked at designed parking areas, with wheels are blocked. ❑ Instruct all drivers to take shelter at canteens (concrete buildings).
Fire Department	❑ Equip the fire tenders with rescue equipment, safely park the fire tenders and secure its wheel by providing blocks.
Project Management Cell (PMC)	❑ Stop all activities, park the cranes and equipment's at safe location, lower the booms of cranes and secure them. ❑ Ensure all erected structures are secured with guy ropes and ties are provided. ❑ Remove all loose materials from top of buildings and structures or secure them. ❑ Ensure all workmen are sheltered at safe locations like canteens (concrete buildings). ❑ Secure the Jetty area piling rigs and cranes by tying with guy ropes. ❑ Stop all project vehicle movements and ensure the vehicles are parked at safe location with wheels are blocked. ❑ Ensure the barge type floating cranes are off loaded and brought to shore and its boom is downed. ❑ Ensure all vehicles and cranes are removed from break water embankments.

4.3.2 EARTHQUAKE

Earthquake is most likely to occur without pre-warning and so its severity and destructive potential are highly unpredictable. Earthquake can result in collapse of buildings, structures & elevated equipment, heavy casualties apart from fracture of underground pipelines and uprooting of energized wires etc. The plan to deal with earthquake can be divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** ❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01) Note ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ **Liaise with HOD – HR to identify control centers equipped with:** ❖ Communication facilities. ❖ Emergency vehicles/ equipment. ❖ List of emergency contacts & suppliers. ❖ Medical facilities.
ACTION DURING EFFECTIVE PERIOD	

Individuals	❑ Do not panic. ❑ Avoid standing near windows, external walls. ❑ Stand near columns or duck under sturdy furniture. ❑ Assemble at emergency assembly point.
ACTION AFTER EFFECTIVE PERIOD	
Site Incident Controller **Port Key Person**	❑ Take head count. Activate Port emergency plan. ❑ Liaise with Site Main Controller for shut down of Port(s) if required. ❑ Liaise with HOS – Fire Services to initiate search & rescue. ❑ Liaise with – Occupational Health Center Services to provide first aid to the victims and remove causalities (if any). ❑ Report at site. ❑ Assess damage. ❑ Undertake restorative measures & repairs. ❑ Liaise with HOS –Occupational Health Centre to follow up on causalities.

4.3.3 TSUNAMI

Tsunami is Japanese for "harbor wave which is a huge ocean wave that can travel at speeds up to 600 mi/hr (965 km/hr) can have heights of up to 30 m (98 ft), wavelengths of up to 200 km (124 mi) and long periods, usually between 10 and 60 minutes. Sometimes incorrectly called a tidal wave, a tsunami is usually caused by an underwater earthquake or volcanic eruption and often causes extreme destruction when it strikes land. It is a series of waves which travel outward on the ocean surface in all directions in a kind of ripple effect. Since the waves can start out hundreds of miles long and only a few feet high, they would not necessarily be noticeable to a passing ship or a plane flying overhead. The plan to deal with Tsunami can be divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** ❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01), Marine Control Officer (01), POC Officer (01) Note ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ **Liaise with HOD – Marine to identify control centers equipped with:** ❖ Communication facilities. ❖ Emergency vehicles/ equipment (tugs, speed/mooring boat). ❖ List of emergency contacts (POC, Marine Control, Deputy PFSO, Port Security) ❖ Occupational Health Facilities.
ACTION DURING EFFECTIVE PERIOD	

Individuals	❑ Do not panic. ❑ Avoid standing near to sea side. ❑ Stand near columns or duck under sturdy furniture. ❑ Assemble at emergency assembly point.
ACTION AFTER EFFECTIVE PERIOD	
Site Incident Controller **Port Key Person**	❑ Liaise with Site Main Controller for shut down of Port(s) if required. ❑ Liaise with HOS – Security and HOS – Fire Services to search & rescue. ❑ Liaise with HOS – Occupational Health Center to provide first aid to the victims and remove causalities (if any). ❑ Report at site. ❑ Assess damage. ❑ Undertake restorative measures & repairs. ❑ Liaise with HOD – Human Resources & Administration.

4.3.4 FLOOD

An overflowing of water onto land that is normally dry. A flood tide is an abundant flow or outpouring. It is a temporary rise of the water level, as in a river or lake or along a seacoast, resulting in its spilling over and out of its natural or artificial confines onto land that is normally dry. Floods are usually caused by excessive runoff from precipitation or snowmelt, or by coastal storm surges or other tidal phenomena. Floods are sometimes described according to their statistical occurrence. A fifty-year flood is a flood having a magnitude that is reached in a particular location on average once every fifty years. In any given year there is a two percent statistical chance of the occurrence of a fifty-year flood and a one percent chance of a hundred-year flood.

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ Constitute Emergency Response Team(s) comprising of at least: ❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01) Note ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ **Liaise with HOD – HR to identify control centers equipped with:** ❖ Communication facilities. ❖ Emergency vehicles/ equipment. ❖ List of emergency contacts & suppliers. ❖ Medical facilities.
ACTION DURING EFFECTIVE PERIOD	

Individuals	❑ Do not panic. ❑ Avoid standing near to sea side. ❑ Stand near columns or duck under sturdy furniture. ❑ Assemble at emergency assembly point.
ACTION AFTER EFFECTIVE PERIOD	
Site Incident Controller	❑ Liaise with Site Main Controller for shut down of Port(s) if required. ❑ Liaise with HOS – Security and HOS – Fire Services to search & rescue. ❑ Liaise with HOS – Occupational Health Center Services to provide first aid to the victims and remove causalities (if any).
Port Key Person	❑ Report at site. ❑ Assess damage. ❑ Undertake restorative measures & repairs. ❑ Liaise with HOD – Human Resources & Administration.

4.3.5 INDUSTRIAL UNREST

Industrial relation between personnel and management may deteriorate because of any reason. Problems, which may arise due to industrial unrest, include:

- ❖ Dharna/ Strike/ Hunger strike
- ❖ Unofficial gatherings/ Gate meetings/ Forceful entry
- ❖ Work to rule/ Go slow/ Disobedience
- ❖ Gherao/ Rasta roko
- ❖ Intimidation & Use of force
- ❖ Support from local & criminal elements
- ❖ Sabotage

In such a scenario, to ensure smooth operation of Port, protection of lives and property, well-coordinated effort is needed from all concerned. Plan to deal with industrial unrest can be broadly divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** ❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01) Note ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ Plan 8 hours shift. ❑ Liaise with HOD – HR for food stock, water, blankets & bedding and medicine.

INDUSTRIAL UNREST (Cont.)

Action By	Activity

ACTION BEFORE EFFECTIVE PERIOD	
Port Key Person	❑ Liaise with Site Main Controller ❑ Liaise with HOD – Security for security & vigilance requirements. ❑ Liaise with HOD – HR for planning of accommodation of additional personnel and transport for additional requirements of vehicle (if any).
ACTION DURING EFFECTIVE PERIOD	
Port Key Person	❑ **Liaise with HOD – Security for** ❖ Strengthening security at sensitive points. ❖ Ensuring protection of lives & property. ❖ Vigilance & patrolling. ❖ Maintaining law & order. ❑ **Liaise with Site Main Controller for** ❖ Updates on the situation.
ACTION AFTER EFFECTIVE PERIOD	
Port Key Person	❑ **Assess damage (if any).** ❑ **Liaise with Site Main Controller for restoring normalcy.**

4.3.6 BOMB THREAT

Bombs can have devastating effect not only on the Adani Port but also on neighboring areas. Hence, any threat received regarding plantation of the bomb shall be viewed seriously. Plan to deal with bomb threat can be divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ **Constitute Search Team(s) comprising of at least:** ❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01) Note ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ Increase awareness in the Port personnel regarding threat perception (not to handle suspicious objects, report suspicious movements by unknown persons).
ACTION BEFORE EFFECTIVE PERIOD	

Port Key Person	❑ Inform all personnel to provide information regarding unidentified or suspicious objects/ persons. ❑ Liaise with Port Operation Centre. ❑ Liaise with HOD – Security for ❖ Intensifying vigilance & patrolling. ❖ Initiating bomb search. ❖ Making arrangements to minimize effects. ❖ Making arrangements for evacuation.
ACTION DURING EFFECTIVE PERIOD	
PortKey Person basis.	❑ Liaise with Site Main Controller for any action to be taken on case to case
ACTION AFTER EFFECTIVE PERIOD	
Port Key Person	❑ Liaise with Site Main Controller for restoring normalcy (if bomb recovered/ no untoward incident occurs). If blast occurs ❑ Assess damage (if any). ❑ Take restorative measures. ❑ Liaise with Site Main Controller.

4.3.7 WAR

During an outbreak of war, bombarding by enemy planes at Mundra site can have devastating effects. Plan to deal with bomb threat can be divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ Constitute Emergency Response Team(s) comprising of at least: ❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01) Note ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ Make arrangements for camouflage the flares. ❑ Liaise with HOD – Security to increase awareness in the Port personnel regarding war.
ACTION BEFORE EFFECTIVE PERIOD	
Port Key Person	❑ Liaise with Port Operation Centre. ❑ Liaise with HOD – Security for ❖ Intensifying vigilance & patrolling.
ACTION DURING EFFECTIVE PERIOD	

Port Key Person	❑ **Liaise with Site Main Controller for minimizing light (during night) & obtaining updated information.** ❑ **Liaise with HOD – Security for evacuation of non-essential personnel.**
ACTION AFTER EFFECTIVE PERIOD	
Port Key Person	❑ Assess damage (if any). ❑ Liaise with Site Main Controller to restore normalcy**.**

4.3.8 FOOD/WATER POISIONING

Plan to deal with food/ water poisoning can be divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ Liaise with HOS – Occupational Health Services: ❖ To impart training regarding food/ water poisoning. ❖ For supply of medicines, saline water etc.
ACTION DURING EFFECTIVE PERIOD	
PortKey Person to:	❑ Liaise with Site Main Controller & HOS – Occupational Health Services ❖ Identify the contaminant source. ❖ Seize contaminated material. ❖ Take preventive measures to avoid recurrence. ❖ Inform all concerned. ❖ Arrange sample analysis & alternate supplies. ❖ Arrange medical assistance to the victims.
ACTION AFTER EFFECTIVE PERIOD	
Port Key Person	❑ **Liaise with Site Main Controller & HOS – Occupational Health Services to:** ❖ Conduct epidemiological investigation to identify the cause. ❖ Take preventive measures to avoid recurrence. ❖ Follow up on causalities.

4.3.9 FIRE

Plan to deal with fire can be divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	

Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** ❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01) Note ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ **Liaise with HOS – Fire Services to:** ❖ Maintain adequate fleet of fire tenders & firefighting equipment. ❖ Maintain patrolling to eliminate potential sources of fire hazard. ❖ Impart regular refresher training to auxiliary fire squad members.
ACTION DURING EFFECTIVE PERIOD	
Emergency Response Team	❑ Activate alarm. Try & contain fire. ❑ Liaise with Site Main Controller, HOS – Fire and HOS – Occupational Health Services to: ❖ Evacuate non-essential personnel. ❖ Ensure search & rescue ❖ Ensure causalities receive attention. ❑ Liaise with HOD – Security to restrict movement in affected area.
ACTION AFTER EFFECTIVE PERIOD	
Emergency Response Team	❑ Assess damage. ❑ Implement fire preventive measures. ❑ Undertake restorative measures & repairs. ❑ Liaise with HOS – Occupational Health Services to follow up on causalities.

4.3.10 MAJOR RELEASE OF FLAMMABLE/TOXIC CHEMICALS

Plan to deal with major release of flammable/ toxic chemicals can be divided in stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** ❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01) Note ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ **Maintain under flow baffle, over flow baffle, blocking gates & dykes.** ❑ **Liaise with HOD – QHSE for:** ❖ Conducting regular audits. ❖ Training of persons regarding various aspects of spillage. ❖ Identifying locations to set up blockages. ❑ Liaise with HOS – Fire Services for acquiring equipment for recovery.

ACTION BEFORE EFFECTIVE PERIOD	
Emergency Response Team	❑ Control, block or contain flow of spillage. ❑ Suspend all hot work in the vicinity & isolate electric powers to affected area(s). ❑ Recover or direct spill material to effluent pit. ❑ Liaise with HOS – Fire/ Occupational Health Services to: ❖ Evacuate non-essential personnel. ❖ Administer first aid to victims. ❑ Liaise with HOD – Security to restrict movement in the area. ❑ Liaise with Site Main Controller for external assistance required (if any).
ACTION AFTER EFFECTIVE PERIOD	
Emergency Response Team	❑ Assess damage. ❑ Implement fire preventive measures. ❑ Undertake restorative measures & repairs. ❑ Liaise with HOS – Occupational Health Services to follow up on causalities.

Onshore Oil Spill Collection Plan

Onshore Oil spills are classified into three categories

- ❑ Leakage within the enclosure and oil spill is retained by the dyke wall.
- ❑ Leakage from the pipe lines.
- ❑ Leakage from the tanker truck carrying the oil.

Facilities available

- ❑ As the enclosure tanks are stored with various oil products the bund walls are provided to retain the product individually for every tank.
- ❑ For the storage of spilled product, slop tanks are available in each enclosure.
- ❑ 2 nos. Portable pumps of intrinsically safe are available.
- ❑ The tank farm drain point valves are kept closed.
- ❑ Pipe lines are available to transfer the spilled product to slop tank.
- ❑ Spill collection kit is available. (6 nos. Drip trays, 4nos. Empty barrels, 4nos. Carboys, 4nos. Funnels, 2nos. Barrel shifting trolleys and 10nos. Soaking pads, 4 nos. Bonding wire with clamps 20mts long).
- ❑ Emergency response team to collect the spilled oil is available in each shift.
- ❑ PPE‘s are available.

Leakage within the enclosure and oil spill is retained by the dyke wall

Sr.No.	Corrective Action	Action By
1.	Inform Security and stop all vehicles entering the Liquid Terminal and stop all vehicles inside and remove unwanted workmen from the liquid terminal.	LT Shift Incharge/ Security
2.	Inform and assemble the Emergency Response Team at spillage site.	LT Shift Incharge
3.	Ensure necessary PPE‘s are worn by the emergency response team.	LT Shift Incharge
4.	Shift the intrinsically safe portable pump to nearby location to facilitate pumping of the product to slop tank.	LT Shift Incharge

5.	Shift the spill collection kit to the location.	LT Shift Incharge
6.	Inform fire department to perform standby with fire fighting facility.	LT Shift Incharge
7.	Lay the pump suction line foot valve in the pool of spilled liquid.	LT Shift Incharge
8.	Connect the pump discharge line to pipe line network leading to slop tank.	LT Shift Incharge
9.	Ensure jumpers/ bonding is provided if other than wire breaded hose is used or PVC/ Rubber hoses are used (from foot valve to pump & pump to pipe line).	LT Shift Incharge
10.	Give power supply to the pump and run the pump.	LT Shift Incharge
11.	Switch off the pump once the spilled oil level goes below the foot valve and air sucks in.	LT Shift Incharge
12.	Collect the remaining oil with the help of soaking pad, carboys and put it in barrels.	LT Shift Incharge
13.	Pump the oil collected in barrels to slop tank.	LT Shift Incharge
Leakage from the pipe lines		
Sr.No.	**Corrective Action**	**Action By**
1.	Stop the leakage by switching off the pump. Arrest the leakage by closing the valve or plugging the leakage point.	LT Shift Incharge
2.	Inform security and establish security posts at the junction of roads where the pipe line is leaking.	LT Shift Incharge/ Security
3.	Road blockage shall be establised at least 200mts away from the leakage point.	Security
4.	Ensure vehicles are stopped or rerouted 200mts away from leakage point.	Security
5.	Do not allow to switch on or switch off any electrical equipment within 200mts radious of leakage point.	Security
6.	Do not allow mobile phones within the radious of 200mts.	Security
7.	Inform fire department to perform standby duty with fire fighting facility.	LT Shift Incharge
8.	Inform and assemble the Emergency Response Team at spillage site.	LT Shift Incharge
9.	Ensure necessary PPE‘s are worn by the emergency response team.	LT Shift Incharge
10.	Shift the spill collection kit to the location.	LT Shift Incharge
11.	With the help of soaking pad collect the spilled oil in carboys and barrels.	LT Shift Incharge
12.	Shift the barrels to waste oil storage area and dispose it through vendors.	LT Shift Incharge
13.	Put sand or saw dust and clean the area.	LT Shift Incharge

14.	Take action to permanantly arrest the pipe line leakage.	LT Shift Incharge
Leakage from the tanker truck carrying the oil		
1.	Arrest the leakage by closing the particular tanker campartment valve or plugging the leakage point.	LT Shift Incharge
2.	Inform security and establish security posts at the junction of roads where the tanker truck is parked.	LT Shift Incharge/ Security
3.	Road blockage shall be establised at least 200mts away from the leakage piont.	Security
4.	Ensure vehicles are stopped or rerouted 200mts away from the leakage point.	Security
5.	Do not allow to switch on or switch off any electrical equipment within 200mts radious of leakage point.	Security
6.	Do not allow mobile phones within the radious of 200mts.	Security
7.	Inform fire department to perform standby duty with fire fighting facility.	LT Shift Incharge
8.	Inform and assemble the Emergency Respose Team at spillage site.	LT Shift Incharge
9.	Ensure necessary PPE's are worn by the emergency response team.	LT Shift Incharge
10.	Shift the spill collection kit to the location.	LT Shift Incharge
11.	With the help of soaking pad collect the spilled oil in carbouys and barrels.	LT Shift Incharge
12.	Shift the barrels to waste oil storage area and dispose it through vendors.	LT Shift Incharge
13.	Put sand or saw dust and clean the area.	LT Shift Incharge

- In all emergencies LT Shift incharge shall inform QHSE department and QHSE department shall monitor everything is happening as per the action plan and guide where ever required.
- For the purpose of Emergency Response Team HOD Liquid Terminal shall ensure at least two staffs are identified and they are available in each shift. The work force for collecting the spill is arranged by stopping some of the LT activities and also can be obtained from Fire Department.
- Fire department shall spare at least four persons (firemen) for spill collection purpose and they shall work under the guidance of LT shift incharge.
- Fire department shall also perform standby duty with fire fighting arrangements during the entire course of spill collection operation.

4.3.11 MAJOR RELEASE OF FLAMMABLE/TOXIC GASES

Plan to deal with major release of flammable/ toxic gases can be divided in following stages:

Action By		Activity
PLANNING & PREPAREDNESS		

Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** ❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01) Note ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ Maintain pressure relief valves & vents. ❑ Identify location to isolate, redirect the lines to flares or re-circulation. ❑ Liaise with HOD – QHSE for: ❖ Conducting regular audits. ❖ Training of persons regarding various aspects gas leakage. ❑ Liaise with HOS – Fire Services for personnel protective equipment.
ACTION DURING EFFECTIVE PERIOD	
Emergency Response Team	❑ Control, block or contain leakage. ❑ Suspend all hot work in the vicinity & isolate electric powers to affected area(s). ❑ Isolate and redirect the lines to flares or re-circulation. ❑ Liaise with HOS – Fire/ Occupational Health Services to: ❖ Evacuate non-essential personnel. ❖ Administer first aid to victims. ❑ Liaise with HOD – Security to restrict movement in the area. ❑ Liaise with Site Main Controller for external assistance required (if any).
ACTION AFTER EFFECTIVE PERIOD	
Emergency Response Team	❑ Assess damage. ❑ Implement fire preventive measures. ❑ Undertake restorative measures & repairs. ❑ Liaise with Coordinator – Occupational Health Services to follow up on causalities.

4.3.12 TRANSPORTATION INCIDENTS INVOLVING HAZARDOUS MATERIAL

Various hazardous materials are normally transported to and from **Adani Port** by tank lorries. These tank lorries have the potential to mechanical failures & road incidents (within and/ or outside the complex) resulting in the possible scenarios viz. spillage, leakage, fire & explosion that might pose an imminent danger to vehicular traffic and surrounding populations [mostly in built-up areas] apart from threat to an environment. The plan to deal with transportation incidents involving hazardous material may be divided in following stages:

Action By		Activity
PLANNING & PREPAREDNESS		

Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** ❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01) Note ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ Collect information about the product and specification/ design of the tanker for the product. ❑ Liaise with HOD – Security for: ❖ Ensuring safety equipment & fitness certificates are valid. ❖ Auditing the tankers. ❖ Awareness program for transporters, drivers' etc.
ACTION DURING EFFECTIVE PERIOD	
Emergency Response Team	❑ **Liaise with HOD – Security/ Driver/ Transporter to:** ❖ Ascertain extent of damage and impact. ❖ Control, block or contain leakage. ❖ Inform various agencies. ❖ Request for assistance. ❖ Restrict movement in the affected area.
ACTION AFTER EFFECTIVE PERIOD	
Emergency Response Team	❑ Assess damage. ❑ Undertake restorative measures & repairs. ❑ Liaise with HOS – Occupational Health Services to follow up on causalities

4.3.13 MARINE EMERGENCY

Shipping fleet operates outside the premises of **Adani Port** and is subject to international, national and local rules. Marine emergencies are classified into:

On-shore Emergency (Nature I & Nature II)

- May occur in Jetty/ Shipping Division area.
- Shall be handled as per the Adani Port Emergency Action Plan.
- Senior most functionaries to take charge as Emergency Coordinator (Site Incident Controller).
- Radio Room shall function as Marine Control Center.

On-site Emergency (Nature I - Level-I or Nature I – Level II)

- May occur on board APSEZ vessels (not requiring external help)
- Master shall assume charge on board vessel
- Senior most functionaries to take charge as Emergency Coordinator (Site Incident Controller).

Off-Site Emergency (Nature-II)

- Shall be handled as per Contingency Manual & Single Point Mooring Operations Manual.
- Master shall assume charge on board vessel.
- Senior most functionaries on shore to take charge as Emergency Coordinator (Site Incident Controller).

In case of an Oil Spill, the action plan shall be as per "Oil & Chemical Spillage Response Plan" During any of the above-classified marine emergencies:

MARINE EMERGENCY (Cont.)

- During working hours
  - Key Person or senior most functionary to assume charge of Site Incident Controller
  - Next senior most functionary to assume charge of Deputy Site Incident Controller
  - Coordinators to report at Site Shift Managers Office
- During silent hours
  - Radio Officer in duty to assume charge of Site Incident Controller
  - Shift Officer to assume charge of Deputy Site Incident Controller
  - Coordinators to report at Site Shift Managers Office
- Oil & Chemical Spillage Response Plan

CHAPTER – 5

EMERGENCY PREPAREDNESS

5.01 FIRE FIGHTING FACILITIES AVAILABLE WITH ADANI PORT, MUNDRA

5.1.1 FIRE FIGHTING SYSTEM AT THE JETTY

5.1.2 LIQUID TERMINAL

5.1.3 DRY CARGO AREA

5.1.4 TERMINAL – 2:

5.1.6 CONTAINER TERMINAL – 3 [SOUTH BASIN]:

5.1.7 TERMINAL – 1:

5.1.8 WEST BASIN:

5.1.9 ADANI HOUSE & PUB :

5.2.0 SAFETY EQUIPMENTS & PERSONAL PROTECTIVE EQUIPMENTS AVAILABLE WITH ADANI PORT

5.01 FIRE FIGHTING FACILITIES AVAILABLE WITH ADANI PORT, MUNDRA

Adequate fire fighting systems are provided for protection of berths, buildings and facilities of the port. The fire fighting facilities are based upon TAC and NFPA guidelines.

The pumps and fire water pipe network system are provided to serve hydrants suitably located around the entire premises with Extinguishers, Hydrants, Hose boxes and Monitors. The Fire & Safety staff of the **Adani Port** covers the entire premise and provides suitable fire protection coverage with mobile equipment, personnel, etc. The capacity of the fire water system is sized to fight a fire hazard at the proposed berth. A general guidelines for the fire hydrant system is as given below:

5.1.1 FIRE FIGHTING SYSTEM AT THE JETTY

The fire fighting systems at all the berths are designed to be combined with foam concentrate systems. 08 Water/Foam Monitors are installed on the four berths, so that the manifold area of the maximum tanker size (including the tanker drift movements) is included in their throw pattern. An additional Jumbo Jet Water Curtain Nozzle installed at berth no. 01 & 02 to isolate the Valve manifold area or the tanker, in case of fire at one or the other.

- Adequate foam storage is provided to ensure firefighting in all areas for a minimum period as in accordance with Indian Standards or NFPA but on no account less than 30 minutes.
- All the firefighting systems is designed in accordance with the Indian and NFPA standards.
- The system follows the minimum design criteria as stipulated in the Guidelines, which are summarized hereunder:

  - In case of fire, the ship will be towed to the open sea and the firewater protection for the ship will be treated as first aid until towing is done.
  - One single largest risk is considered for providing fire protection facilities.
  - Sea water, which is available at the location, will be conveniently used.
  - As port terminals handling ships of size less than 50,000 DWT, one set of firewater pumps are provided this will cater to both monitors as well as hydrant service and water curtains.
  - The firewater pressure system is designed for a minimum residual pressure of 7 kg/m^2 at the hydraulically remotest point of application in the terminal.
  - Fire water flow rate will be the aggregate of the following:
  - Water flow for Water/Foam Monitors for protection of loading arms/piping manifold and ship;
  - Water flow for areas segregation through water curtains between ship and loading
  - arms and hydrant service.
  - The water network laid to ensure multi-directional flow wherever possible. Isolation valves are provided in the network to enable isolation of any section of the network.

The major components of the firefighting system for the berths are as follows:

1. **Monitors:**
   Two monitors with an adequate capacity with suitable horizontal throw. The positions of the monitors are so designed to cover the entire area of largest tanker berthed at Jetty.

2. **Curtain nozzles:**
   These nozzles are provided between unloading arms and the tanker at berth no. 01 & 02 for segregation of the two with a water curtain.

3. **Water hydrants:**
   Water hydrants are stand post type and are double headed. One hydrant post is provided for every 30 meters length on the jetty. These are located alongside berths for easy accessibility. 6" hydrant heads with standard twin 63 mm hydrant valves are used.

4. **Mobile Monitor:**
   One unit of Mobile Monitor with 800 ltrs foam in tank kept at jetty to reinforce fire fighting system during handling of Chemicals /Hydrocarbons.

5. Foam-concentrate drums are provided for the foam monitors (with 3% concentrate). A total of 3310 ltrs of AR-AFFF concentrate are stored in easily cartable Jerry cans of 20-ltrs and 200 ltrs capacity drum kept at Marine Terminal.

6. Firewater network ring main is of 300 mm diameter.

5.1.2 LIQUID TERMINAL

Presently there are 97 tanks at Liquid Terminal and the area of the tank farm is divided in three zones. They are CTF (61 fixed roof tanks), POL (8 tanks including two floating roof tank), EOL (25 fixed roof tanks) and Bitumen Terminal (3 fixed roof tanks) The Fire fighting systems at the Liquid Terminal area is fully approved by the TAC. It is designed to meet the demand of two major fires at distinct locations. The essence of the systems is quick knock down of fire at the earliest instance. The fire fighting systems consists of six electric pumps, four diesel pumps and two Jockey pump and ring main of 300/250 mm dia. each tank of CTF, POL and Bitumen Terminal is protected with devoted foam and water protection system. All the loading bays and enclosure are suitably covered with Water Monitors and Hydrants.

The major components of the fire fighting system for the Liquid Terminal is as follows:

a. Foam Pourers:

All the fixed roof & floating roof tanks of CTF, POL & Bitumen Terminal are covered by Foam Pourer System. The Foam could be operated by quick opening type butterfly valve positioned near each tank. In case of bitumen tanks foam have to feed in the line from external source.

b. Water Spray Rings:

All the tanks of CTF and EOL are protected by medium velocity water spray system all around the tanks. The discharge rate of water spray is 3 lpm/m^2 for the effective cooling against radiation heat. The water sprays are also operated by quick opening type butterfly valves.

c. Water Monitors:

All the Loading Bays, Tank enclosures are adequately covered by the Water Monitors. The water monitors are strategically positioned to cover maximum area. the monitors are manually operated by the valves placed with each monitor.

d. Hydrants:

Double headed Hydrants are evenly positioned all over the Terminal area in accordance with TAC and NFPA guidelines

5.1.3 DRY CARGO AREA

The Dry Cargo area is the zone of moderate risk hence only fully pressurized Hydrant system is provided. The well designed Single and Double outlet type hydrant posts are located all around the open storage yards and the covered godowns.

a. Hydrants:

All the open and covered type of storage areas are covered by Single or double type Hydrant posts. The hydrant system is kept fully pressurized at 7 Kg/cm^2 with a minimum operating pressure of 6 Kg/cm^2 at any point in the system.

■ FIRE STATION

The Fire station is the nerve center of the Fire concerned matters. The Fire Station Control Room is continuously 24 hours a day, 365 days a year. The control room is equipped with modern communication gadgets like, Wireless set, internal telephone & Mobile phones. Apart from the communication systems, the Fire fighting vehicle Foam Tender and Fire Engine are also stationed there. All sorts of firefighting equipment and appliances are stowed in the Fire Station.

The bellow given is the list of some of the equipments stowed at Fire Station.

- Spare fire extinguishers and foam compound drums
- Delivery Hose pipe
- Different types of Branch Pipes & Foam making equipment.
- First aid Firefighting extinguishers
- Mobile Foam Monitors
- Foam Mobile Units
- Fire suits
- First aid kit
- Safety belts
- Ropes
- Cutting tools
- SCBA
- Safety helmets

PPEs - goggles, Apron, shoes, gloves, nose mask, gumboots

5.1.4 TERMINAL – 2:

- Fire Control Room : Fire Station
- Emergency Siren : 1.6 km range manually operated siren
- Fire Control Plan : As Mentioned Below

Fire Pump: 273 m^3/hr discharge X 02 nos. of Vertical Turbine Diesel Driven Pump and 30 m^3/hr discharge X 01 no. of Vertical Turbine Electric Driven Jockey Pump for fire prevention at Terminal- 2 and back-up yard.

Fixed Fire Fighting System: 14 no. of Double Headed Fire Hydrant at jetties, 18 nos. of Single Headed Fire Hydrants at Terminal – 2 back-up yard and 10 nos. of Delivery Hose kept at pump house for fire prevention.

Fire Extinguishers:
Dry Chemical Powder Fire Extinguishers : 03 no. of 50 kg., 20 no. of 10 kg., 10 no. of 2 kg
CO2 Fire Extinguishers: 15 no. of 4.5 kg.

5.1.5 CONTAINER TERMINAL – 2 [ADANI MUNDRA CONTAINER TERMINAL]:

- Fire Control Room : Fire Station
- Emergency Siren : 1.6 km range manually operated siren

- Fire Control Plan : As Mentioned Below

Fire Pump: 273 m^3/hr discharge X 1 no. of Vertical Turbine Electric Driven Main Pump and 273 m^3/hr discharge X 01 no. of Vertical Turbine Diesel Driven Pump and 25 m^3/hr discharge X 1 no. of Vertical Turbine Electric Driven Jockey Pump for fire prevention at AMCT.

Fixed Fire Fighting System: 33 no. of Single Headed Fire Hydrant, 10 no. of Water Monitors and 20 nos. of Delivery Hose with Hose Station for fire prevention.

Fire Extinguishers:
DCP Fire Extinguishers: 40 Nos. (2 kg), 10 Nos. (9 kg), 5 Nos. (10 kg), 3 Nos. (50 kg) CO2 Fire Extinguishers 70 no. (4.5 kg), 24 (3.5 kg) for QC, RTG, Other Area.

5.1.6 CONTAINER TERMINAL – 3 [SOUTH BASIN]:

- Fire Control Room : Fire Station
- Fire Control Plan : As Mentioned Below

Fire Extinguishers: for for QC, RTG and other area CT 3.
CO2 Fire Extinguishers: 65 Nos (2 kg), 45 Nos (4.5 Kg) for for QC, RTG and other area CT 3.
DCP Fire Extinguishers: 40 Nos (2 kg), 13 Nos (5 Kg), 10 Nos (10 Kg)

Fire Tender: Multipurpose Fire Tender

5.1.7 TERMINAL – 1:

- Fire Control Room : Fire Station
- Emergency Siren : 5 km range manually operated siren
- Fire Control Plan : As Mentioned Below

Fire Pump: 273 m^3/hr discharge X 02 nos. of Vertical Turbine Diesel Driven Pump and 30 m^3/hr discharge X 01 no. of Vertical Turbine Electric Driven Jockey Pump for fire prevention at Terminal- 1.

Fixed Fire Fighting System:
33 no. of Double Headed Fire Hydrant at jetties, at Terminal – 1 and 70 nos. of Delivery Hose kept at pump house for fire prevention. 8 no. of Water / Foam Monitor.

Fire Extinguishers:
DCP Fire Extinguishers: 16 no (50 kg). 15 no (10 kg), 8 no (2 kg)
CO2 fire extinguishers: 12 no (4.5 kg)

5.1.8 WEST BASIN:

- Fire Control Room : Porta Cabin, Fire Station
- Emergency Siren : 1 at SS – 1 Building [Range 1.6 km], Manual Siren [Range 1.6 km] at Fire Station
- **Fire Control Plan : As Mentioned Below**

Fire Pump: 273 m^3/hr discharge X 2 no. of Horizontal end suction type Electric Driven Main Pump and 273 m^3/hr discharge X 01 no. of Horizontal end suction type Diesel Driven Pump and 10.8 m^3/hr discharge X 1 no. of Back pull out type Electric Driven Jockey Pump for fire prevention at West Basin.

Fixed Fire Fighting System: 122 no. of Single Headed Fire Hydrant, 99 no. of Water Monitors and 250 no. of Delivery Hose for fire prevention.

Fire Extinguishers:
DCP Fire Extinguishers: 16 no (50 kg). 15 no (10 kg), 8 no (2 kg)
CO2 fire extinguishers: 12 no (4.5 kg)

Fire Tender:
- Water Tank capacity (in built) - 6000 liters
- Pump discharge - 2250 LPM
- Aluminized Suit - 01 no.
- Water Jel Blanket - 01 no.
- Delivery Hose - 20 nos.
- 35‖ Alluminium Extension Ladder - 01 no.
- Self-contained Breathing Apparatus Set - 03 no.

Other firefighting related equipment.

5.1.9 ADANI HOUSE & PUB :

- Fire Control Room : Fire Station
- Emergency Siren : Adani house & PUB

- Fire Control Plan :

Fire Pump:

96.10 m^3/hr discharge X 01 no. of Electric Driven Main Pump,
10.8 m^3/hr discharge X 01 no. of Electric Driven Jockey Pump for fire prevention.

Fixed Fire Fighting System:

- **Adani House:** 9 nos of Single Headed Fire Hydrant, 5 nos of Hose Reel Hose, 18 nos of Delivery Hose kept at Adani House.
- **PUB:** 19 nos of Single Headed Fire Hydrant, 15 nos of Hose Reel Hose, 38 nos of Delivery Hose.

Fire Extinguishers:

- DCP Fire Extinguishers: 22 nos of 10 kg
- CO2 Fire Extinguishers: 40 nos of 4.5 kg, 8 nos of 9 kg, 2 nos of 22.5kg

Auto Flooding System: NAF S125 Flooding System at IT Server Room and UPS Room connected with Fire Detection System to protect from fire.

Fire Detection System:

- Smoke Detector System in Entire Adani House.
- Separate Fire Alarm System for PUB buildings

5.2.0 SAFETY EQUIPMENTS & PERSONAL PROTECTIVE EQUIPMENTS AVAILABLE WITH APSEZ

HAZARD KIT
The following items of hazard kits are under procurement/have been procured.
Protective Clothing

- Chemical protective suits
- Proximity suit
- Neoprene 14" gloves
- Natural rubber gloves
- Surgical gloves
- High voltage lineman's gloves
- Overalls
- Goggles (polycarbonate lens)
- Hardhats with headband suspensions
- Face shield (full) 10-x19-x.060
- Boots (neoprene, steel toe and modsole)
- Safety harness
- Ear Muffs

Breathing Apparatus

- Emergency Oxygen Bottles.
- Positive pressure self contained breathing apparatus
- Spare cylinders
- Full-face cartridge type respirators

Leak Control Equipment

- Drums
- Epoxy kit
- Patch Kit
- Wooden plug kit
- Rubber plug kit
- Mastic

First Aid Equipment

- Extinguishers capable for handling Class A, B, C and D fires.
- First aid kit (36 units)
- Resuscitator (B.W.S. CPR Portable with aspirator P/N 900 0 002 - 111 - 01 woolen fire blankets.

Miscellaneous

- Teflon thread tape
- Electrical tape
- Pipe pieces, assorted.
- Pipe union, assorted.
- Pipe caps, assorted Hose clamps, assorted.
- Saddle clamps, assorted.
- Couplings (galvanized), assorted.
- Hand cleaner (waterless)
- Flashlight (NS)
- Reflective triangles
- Quick setting cement
- Frontier barriers & safety cones.

Absorbents and Containers

- Absorbent pads
- Plastic can liners / bags
- Recovery drum sets
- Diatomaceous earth bag
- Sponges

Monitoring Equipment

- Combustible gas detector (Explosive meter, Range:0-100 LEL & 0-5ppm)
- Oxygen detector (0-25% oxygen, PAC III, Drage make)
- Organic vapour detector (PAC III, Drager make)
- pH paper (0-14) (Ydrin, 1/2 x 50 with dispenser)
- Indication wind system AC-DC recording cup & vane anemometer with meter telescoping mast.

Miscellaneous

- Portable flood lights (4 Nos.)
- Emergency suits (2 Nos.)
- SCBA - 4 Nos.
- Loud Hailer (battery operated)
- Portable DCP extinguisher
- Emergency Rescue Cage

Tools and hardware

- Drill (electrical)
- Drill set, assorted sizes (short length)
- Drill set, assorted sizes (length)
- Punch set, assorted sizes
- Wire brush
- Paint brushes
- Tape measure steel tape
- Foot ruler (metal)
- Welding kit
- Pipe cutters
- Drum trolleys
- Chemical buckets
- Dust pans
- Hacksaw
- Hacksaw blades

Oxygen Trauma, First-Aid & Emergency Box Kit (Medical)

- Oxygen Cylinder
- Water Jel Blankets
- Rescue Blankets
- Oxygen breathing kit
- Instant Glucose
- Paramedic Scissors
- Forceps
- Gloves
- Ring cutter
- Cervical collar
- Eye pads
- Tourniquets
- Multi-trauma dressings
- Adaptec dressing
- Flexible Bandages
- Pocket Masks - Eyewash bottle
- Bag mask resuscitator
- Portable respirator
- Portable lamps / torches
- Mouth-to-mask
- Blood pressure Equipment

Adequate number of fire tender

- There are three nos of fire tenders one is Foam Tender with water, foam, DCP and CO_2 facility having a centrifugal fire pump. Pump is of gunmetal and stainless steel also with 60 mtrs. long hose and nozzle provided above the pump panel.

- CO_2 gas cylinders of sufficient capacity are mounted for expelling the75 kg DCP extinguishers. The foam tender also carry 6 x 22.5 kg. nos. of CO_2 Cylinder.

- Water Tender of 12000 ltrs water capacity with adequate numbers of fire fighting equipment and rear mounted portable pump of 450 ltr / pmt capacity

Neutralising Agents

- Acid neutralizing agent (neutrasorb 100 = box)
- Neutrasol two
- 2-1/2 gallon container / carton)
- Neutralizer Neutrality
- Clorox

5.03 ABOUT ON-SITE EMERGENCY PLAN

Following three stage activities are planned to perform, as these activities are co-related, provide better ideas for emergency preparedness, and emergency actions with subsequent follow-ups.

a) Pre-emergency activities
b) Emergency time activities
c) Post emergency activities

In Pre Emergency Activities : Following activities are carried-out :: Internal Safety Surveys, Mock Drills & Training : Joint Mock Drills are performed engaging Mutual Aid Units. Arrangement is made to acquire emergency aid in the form of First Aid, chemical leak control, Evacuation, Vehicle for Transportation of affected. Moreover, from Fire Brigade is liaised with. (if the emergency is uncontrollable by the internal resources at the unit).

5.04 ABOUT POST EMERGNECY ACTIVITIES

A) collection of records
B) Making insurance claim
C) Conducting inquiries and taking preventive measures
D) Rehabilitation of affected persons within and outside plant
E) Restart of plant

CHAPTER NO.VI

OFF-SITE EMERGENCY PLAN

CONTENTS

6.00 ABOUT OFF-SITE EMERGENCY PLAN

Ours is a **PORT**, Importing and exporting various goods including liquid chemicals, petroleum products.. Various substances, chemicals are stored at the terminals. Leak of chemicals, fire may lead to a serious off site emergency. In view of this, it is necessary to prepare an off-site emergency plan to deal with any emergency methodically and systematically to control and reduce its effects. In this connection, we have formed a EMERGENCY ORGANIZATION as per Chapter - 3

Incident controllers, Deputy Incident Controllers, Site Main Controllers are appointed and their emergency duties are determined. Arrangements are made for communication with external authorities. Safe assembly points and Emergency Control Centers are determined. Pre-emergency, emergency time and post emergency activities are formulated. A list of all important telephone numbers is prepared. Arrangement is made to get / provide emergency help with mutual aid units. Special knowledge, advise, experts will be available. Liaison will be made with off-site emergency authorities.

6.01 STRUCTURE OF OFF-SITE EMERGENCY

BASIC ACTIONS IN EMERGENCIES

Immediate Actions

Immediate action is the most important factor in emergency control because the first few seconds count, as a fire develops and spreads very quickly unless prompt and efficient actions are taken. In the event of fire in the Port/terminal, the following actions shall be taken as quickly as possible.

- Take immediate steps to stop leakage/fire and raise alarm simultaneously.
- Initiate action as per FIRE ORGANIZATION PLAN or Disaster Management Plan, based on gravity of the emergency.
- Stop all operations and ensure closure of all valves and isolation valves
- All out efforts should be made to contain the spread of leakage/fire.
- Saving of human life shall get priority in comparison to stocks/assets.
- Plant personnel without specific duties should assemble at the nominated place
- All vehicles except those required for emergency use should be moved away from the operating area, in an orderly manner at pre-nominated route.
- Electrical system except for control supplies, utilities, lighting and fire fighting system should be isolated.
- If the feed to the fire cannot be cut off, the fire must be controlled and not extinguished.
- Start water spray system at areas involved in or exposed to fire risks.
- In case of leakage of chemicals without fire and inability to stop the flow, take all precautions to avoid source of ignition.
- Block all roads in the adjacent area and enlist Police support for the purpose if warranted.

Fire Fighting Operations

- Enlist support of local fire brigade and neighboring industries.
- If escaping vapor cannot be stopped, jets of water should be directed at the point of leakage to asset controlled release of vapor and in between water fog should be used for dilution and rapid dispersion of vapor cloud.
- Fire fighting personnel working in or close to un-ignited vapor clouds or close to fire must wear protective clothing and equipment including safety harness and manned life line. They must be protected continuously by water sprays. Water protection for fire fighters should never be shut off even though the flames appear to have been extinguished until all personnel are safely out of the danger area.
- Exercise care to ensure that static charge is not generated in vapor cloud. For this purpose, solid jets of water must be avoided, instead for nozzles should be used.
- Fire fighters should advance towards a fire down – wind if possible.
- Cylinder fire should be approached using proper barricades / protection to avoid direct hit from flying cylinders.
- If the only valve that can be used to stop the leakage is surrounded by fire, it may not be possible to close it manually. The attempt should be directed by trained persons only. The person attempting the closure should be continuously protected by means of water spraying (through fog nozzles), fire entry suit, water jet blanket or any other approved equipment. The person must be equipped with a safety harness and manned life line.
- Any rapid increase in pressure or noise level of product discharged through safety relief vale of the vessel/pipeline should be treated as a warning of over pressurization. In such cases all personnel should be evacuated immediately
- As in case of any emergency situation, it is of paramount importance to avoid endangering human life in the event of fire involving or seriously exposing equipment containing chemicals or serious leakage of chemicals without the fire.

Action in the event of chemical leakage without fire

- Take basic action as detailed in (1) above
- If escaping is not on fire, close any valve which will stop the flow.

Action in the event of fire

- Take basic action as detailed in (1) above.
- Extinguish Fires – A small fire at the point of leakage should be extinguished by enveloping with a water spray. However, it is against, stressed that fire should not, except in special circumstances explained earlier, be extinguished until the escape of product has been stopped.
- Fire fighting procedure – Fire fighting procedures would vary depending upon various factors such as nature, sources sizes, location etc of fire. Basic fire fighting techniques have been explained earlier in section (2). However, for the purpose of guidelines, fire fighting techniques for few common cases are as follows:
- Cylinder Fire If a cylinder is involved in fire, internal pressure may start rising and if not relieved the built up pressure could rise and ultimately rupture the container. Ignition of the escaping gas would aggravate the fire but the release of pressure would reduce the possibility of rupture of the container. No attempt should be made to extinguish the burning gas. But the container and other containers in the vicinity should be kept cool by water sprays until the

contents of the container have burnt away. If the gas leakage does not ignite, the container should be approached from upwind (if in the open air) and be removed to a place of safety remote from sources of ignition.

- Cylinders not directly involved in the fire should be moved away from heat exposure, while applying cooling water sprays on cylinder directly involved.
- Fire on storage vessel: If a pressure vessel is exposed to radiant heat from external fire, it should be kept cool by water sprays to prevent excessive pressure rise in the vessel. Cooling water sprays must be applied without delay in the heat affected areas using fixed water sprinkler system or equivalent spray water coverage, through fixed monitors or other equipment. Cooling the vessel with water sprays reduces the heat input to the vessel and thereby reduces the pressure, thus reducing the rate of discharge from the relief valves.

Fire Fighting Organization Plan

A plan of action for use in the event of a major leakage of with a fire or risk of fire is essential. Such a plan must be carefully prepared for each area. It should be fully understood by all the Port supervisory personnel and other personnel's' responsibilities for action as per plan. It shall be based on the following:

- Port personnel shall be fully trained for specialized techniques necessary for combating leakages and fires.
- If leakage and / or fire occurs, all personnel should use the equipment provided and to carry out their allotted tasks as detailed in the fire fighting organization plan.
- Personnel should be conversant with fire control equipment and also its location.
- Port personnel should be familiar with the standard recognition markings of the control, first-aid and all safety equipment, must know the location of emergency exits, and they should know the location of water points/monitors and must be familiar with the sound of the emergency (fire) alarm.
- The fire fighting organization plan together with layout of fire fighting and safety devices shall be displayed at prominent places and explained to all personnel. It shall include the following functions, expanded to suit the location facilities / equipment:
  - Sounding the emergency (fire) alarm.
  - Shutting off the supply to any leakage point / fire.
  - Summoning the fire brigade / police
  - Fire control, with first-aid, fire fighting equipment
  - Closing down all operations in the area pertaining to emergency
  - Preventing all sources of ignition in case flammable substance' leak occurs
  - Evacuation of vehicles
  - Evacuation and mustering of personnel
  - Establishing an emergency fire-control center
  - Traffic control
  - Stations and duties of all personnel
  - Policing of affected areas
  - Any other specialized duties
  - Display of fire brigade, ambulance, Police telephone numbers etc.
  - All clear signal by competent person.

Liaison with local Fire Brigade

Close co-operation with the local fire authorities is essential and shall take the following form:

- Fire brigade other than of Port should be made familiar with layout of plant and the location of important equipment / facilities provided, and their method of use. Mock fire drills / exercise jointly by plant personnel and outside fire brigades shall be planned.
- Fire fighting equipment at the plant shall be compatible with the outside fire brigade equipment, otherwise adopters shall be kept ready for hoses,
- The outside fire brigade shall be aware of the ports fire fighting organization plan and the views held at the plan regarding the most effective fire control method. (Water insoluble)
- In the event of an emergency / fire, the Port manager and / or his representative shall advise the Fire Officer about particular or potential hazards that may be present at that particular point of time.

Fire Drills & Training

- Drills for all plant personnel, making use of the Fire Fighting Organization plan and practicing the specialized techniques required for fighting fires or dispensing / diluting vapor shall be held minimum once in a month.
- The drills should cover various types of incidents, e.g. Major spillage, leak / fire, cylinder fire etc.
- Extinguishers due for recharging due for hydro testing shall be discharged during drills and replenished subsequently 50% (Min.) stock of refills as replenishment for Fire Extinguishers should be maintained.
- The fire pump should be run, sprinkler system activated, emergency systems tested, water hoses run out and spray / set techniques practiced during drills.
- Fire alarm shall be sounded / tested / neighbouring areas and the fire brigade shall be warned in advance of this test).
- Protective clothing, mask and any other specialized safety equipment available shall be tried out during drills to train all concerned in their application.
- The local fire brigade should be encouraged to participate in fire drills periodically.
- Any shortcoming, noticed during the drill shall be rectified.

ON-SITE EMERGENCY PLAN (DISASTER MANAGEMENT PLAN)

It is basically a pre-plan to handle any emergency situation of a higher magnitude arising out of factors listed below:

- ✓ Major fire / explosions
- ✓ Lighting
- ✓ Heavy floods
- ✓ Earthquakes
- ✓ Sabotage/ terrorist outrage
- ✓ War situation

Due to varying risk potentials and also varying hazards at / around each location _ON SITE EMERGENCY PLAN' for each location shall be drawn up individually based on the outline given below:

- Identify disaster scenario i.e. the situations under which the plan would become operational. Plan for the worst possible scenario.
- Identify resources required from each of the outside agencies.
- Establish outside agencies, role of each agency and obtain their commitment for rendering the assistance in crises situation as per the agreed plan.
- Establish organogram for ON SITE EMERGENCY PLAN based on available manpower in various groups and identify the leader and alternative leader for each of the groups and the role to be played by each team in various likely crises situations.
- Identify Disaster Control room / group.
- Furnish detailed data and drawings relevant for the crises management.
- Mock drills to be conducted minimum once a year.
- Modify the plan based on the experience gained through mock drills and try out the modified plan through subsequent mock drills.
- The plan shall be updated as and when the changes recorded in the plan occur and communication sent to all concerned.

Communication organogram

As a part of ON SITE EMERGENCY PLAN, communication organogram shall be drawn up giving flow of communication from the originating location to various local agencies and also to Statutory Authorities and upwards within the organization to mobilize support and to consider alternatives for maintaining essential supplies. **(As mentioned in Chapter 3.13 & 3.14 Communication & Public Affairs)**

MANAGER (SITE MAIN CONTROLLER)

1. Rush to the port on receiving the message of the incident
2. Call other persons if required.
3. Inform hospitals, doctor, police, dist.authorities, Director, Industrial Safety & Health
4. Arrange for roll call of workers and find if anyone missing
5. Arrange for first aid of injured and hospitalization
6. Arrange food / water for persons controlling the emergency
7. Arrange for money
8. Assess situation & determine area likely to be affected

OCCUPIER

1. Prepare a statement for press & public release and take responsibilities of press and public relationship
2. Plan out rehabilitation / post emergency activities

6.02 ROLE OF MANAGEMENT

A copy of this on-site emergency to be submitted in duplicate to Deputy Director, Industrial Safety & Health, District Authority.

6.03 ROLE OF POLICE AND EVACUTION AUTHORITY

Police may be required for maintaining low and order outside the factory and on the approach road.

6.04 ROLE OF MUTUAL AID UNITS

Agreement with nearby units is to be made for providing help, aid, assistance, vehicle, expert to overcome the situation.

Annexure – 1

IDENTIFICATION OF FACTORY

Full Name & Address of factory		**ADANI PORTS and SEZ LIMITED P.O. Box 1, Mundra – 370 421 (KUTCH) Gujarat, India.**	
Phone	02838-289248	**Office**	
Fax No.	02838-226301	**E-mail**	**info@mundraport.com**
Full Name & Address of the Occupier		**DR. MALAY MAHADEVIA** C/O. ADANI PORTS & S.E.Z. LIMITED NAVINAL ISLAND, MUNDRA.	
Phone No.		**Office**	**Residence**
		--	**--**
Full Name & Address of the Manager		**CEO. DOUGLAS CHARLES SMITH** C/O. ADANI PORTS & S.E.Z. LTD., NAVINAL ISLAND, MUNDRA	
Phone No.		**Office**	**Residence**
		02838- 255726	--
Manufacturing Process		Handling of Dry and Liquid Cargo in Bulk	

Name of the Shift	**Maximum Worker at a time**			
	Male	**Female**	**Total**	In "Workers" include all Employees, Contract Workers, Trainees ,Apprentices, etc.
General Shift – G	1187	42	1229	
Shift – A	402		402	
Shift – B	402		402	
Shift – C	380		380	
Total Shifts:	**2371**	**42**	**2413**	

First Person to be contacted in case of emergency :

Name of the shift	**Name & Designation**	**Place of Availability**	**Phone No.**		
			Mobile	**In Factory**	**Residence**
(A),(B),(C) shifts	Port Operation Center	POC office	9825000949	02838-255762 02838-255781	-

Any Other information, if any : Any of the persons will be available round the clock :

Annexure – 4

STORAGE HAZARDS & CONTROL

Name of the hazardous substance (Mention concentration if any)	Sr. No. of the MSDS enclosed	Quantity		Place of its storage	Operating pressure & Temp.	Type of Hazards possible (Fire, explosion, Toxic release, Spill etc.)	Control Measures Provided	In charge Person	
		Maximum That can be stored	Actually stored (Including in process & handling)					Name & Designation	Phone No.
1	2	3	4	5	6	7	8	9	10
A. Raw Materials:	Available	Storage of Liquid 2.80 Lac KL	50692.398 MT as on 28.09.08	Liquid Storage Tanks	Ambient Temperature and Pressure	Fire, explosion, Toxic Release, Spill	Water Sprinkler, Foam Pourer, Hydrant System	Mr. Anand R. Marathe (Head – LT)	9099005225
B. Finished Product:	--	--	--	--	--	--	--	--	--
C. Intermediates	--	--	--	--	--	--	--	--	--
D. Bye-Products :	--	--	--	--	--	--	--	--	--
E. Other: (E.g. Catalysts, inhibitors etc.)	--	--	--	--	--	--	--	--	--

Note: There is no process or manufacturing activity only storage handling of dry and liquid cargo in bulk.

Annexure – 6

PROCESS & VESSEL HAZARDS AND CONTROLS

Sr. No.	Name of the Plant, Department or place	Name of the hazardous process and operation	Materials in the process/ operation with their quantity	Name of the vessel and its location	Operating parameters: (Pressure, Temp. etc)	Type of hazards possible (exothermic, run away, pressure release, toxic release, fire, explosion etc)	Control Measures provided	In charge Person	
								Name	Tele. No.
1	2	3	4	5	6	7	8	9	10
1	Air compressor (LT workshop)	Air compression	Compressed Air	Air driers & Air Receivers	Pressure	High Pressure release	Safety Valve,	Mr. Anand R. Marathe (Head – LT)	9099005225
2	Nitrogen compressor (LT workshop)	Nitrogen compression	Nitrogen	Nitrogen Receiver	Pressure	Nitrogen release with high pressure	Safety valve		

Annexure – 8

TRADE WASTE DISPOSAL

Sr. No.	Type and Name of the trade waste	Generation per Annum	Place of its generation	Place of its safe disposal	Treatment method adopted for safe disposal	Alarm indicating accidental release or release in excessive proportion	Monitoring & Control measures provided	In charge person's name, Address & Phone No.
1	2	3	4	5	6	7	8	9
1.	Used/Spent Oil	300.0 MT	All the departments	Reception, Collection, Storage, Transportation & Disposal by selling out to registered recycler/ reprocessor	Send to authorized recycler	-----	Disposal by selling out to registered recycler/ reprocessor	Mr. Ashok Sharma, Central Store 8980015147 (M)
2.	ETP Sludge	1.095 MT	Liquid Terminal	Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL		Disposal by co-processing at cement industries	Mr. Anand Marathe Liquid Terminal 9099005225 (M)

Annexure – 8

TRADE WASTE DISPOSAL

Sr. No.	Type and Name of the trade waste	Generation per Annum	Place of its generation	Place of its safe disposal	Treatment method adopted for safe disposal	Alarm indicating accidental release or release in excessive proportion	Monitoring & Control measures provided	In charge person's name, Address & Phone No.
1	2	3	4	5	6	7	8	9
3.	Sludge & Filters contaminated with oil	5.0 MT	All the Departments	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL		Disposal by co-processing at cement industries	Mr. Ashok Sharma, Central Store 8980015147 (M)

Annexure – 8

TRADE WASTE DISPOSAL

Sr. No.	Type and Name of the trade waste	Generation per Annum	Place of its generation	Place of its safe disposal	Treatment method adopted for safe disposal	Alarm indicating accidental release or release in excessive proportion	Monitoring & Control measures provided	In charge person's name, Address & Phone No.
1	2	3	4	5	6	7	8	9
4.	Waste Residue Containing Oil	100.0 MT	All the Departments	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL / Sanghi Cement / Ambuja Cement		Disposal by co-processing at cement industries	Mr. Bhagwat Swaroop Sharma Environment 7622947676 (M)
5.	Bottom sludge	Whatever quantity generated	Liquid Terminal	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL / Ambuja Cement		Disposal by co-processing at cement industries	Mr. Anand Marathe Liquid Terminal 9099005225 (M)

Annexure – 8

TRADE WASTE DISPOSAL

Sr. No.	Type and Name of the trade waste	Generation per Annum	Place of its generation	Place of its safe disposal	Treatment method adopted for safe disposal	Alarm indicating accidental release or release in excessive proportion	Monitoring & Control measures provided	In charge person's name, Address & Phone No.
1	2	3	4	5	6	7	8	9
6.	Pig Waste	24.0 MT	Liquid Terminal	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL / Ambuja Cement		Disposal by co-processing at cement industries	Mr. Anand Marathe Liquid Terminal 9099005225 (M)

Annexure – 13

WEATHER CONDITIONS

Sr. No.	Period of the year Month	Wind Velocity, M/Sec.	Wind Direction	Weather conditions	Pasquill classification A to F
1	2	3	4	5	6
1	JANUARY	5-7	NNE / NE	CALM	D
2	FEBRUARY	5-7	NNE / NE	CALM	D
3	MARCH	7-9	SSW / SW	CALM	D
4	APRIL	9-10	SSW / SW	CALM	D
5	MAY	10-12	WSW / SW	SLIGHT	D
6	JUNE	10-12	WSW / SW	MODERATE / ROUGH	D
7	JULY	12-15	WSW / SW	ROUGH	D
8	AUGUST	12-15	WSW / SW	ROGH / MODERATE	D
9	SEPTEMBER	8-10	WSW / SW	SLIGHT	D
10	OCTOBER	8-9	WSW / SW	CALM	D
11	NOVEMBER	5-7	WSW / SW	CALM	D
12	DECEMBER	5-7	NNE / NE	CALM	D

Legend:
A: Extremely Unstable
B: Moderately Unstable
C: Slightly Unstable
D: Natural
E: Slightly Stable
F: Moderately Stable

Annexure – 14

INCIDENT CONTROLLERS

Sr. No.	Incident Controller's						Runner's		
	Name	Designation	Place of Availability		Phone No.		Name & Designation	Place of Availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	2	3	4	5	6	7	8	9	10
1	Mr. Bhagwat Upadhaye	Head – Dry Cargo	Tug Berth Building	Shantivan Colony	98792 03599 02838-255870	--	Mr. Mahavirsinh Jhala	Tug Berth Building	9687639228 02838-255838
2	Mr. Anand R. Marathe	Head - LT	Liquid Terminal	Shantivan Colony	90990 05225 02838 - 255742	4459	Mr. K R Rao	Liquid Terminal	99252 03436 02838-255872
3	Mr. Ramde Karangiya	Head – AMCT	(AMCT) CT2- New Building	Samudra Township	9099005240 02838 – 255732	--	Mr. Dharmendra Parmar	(AMCT) CT2- New Building	8980015456 02838 - 255917
4	Mr. Jagdish Patel	Head - AICTPL	(AICTPL) CT3 – Building	Samudra Township	99798 55979 02838 – 255732	--	Mr.Hariprasad Desani	(AICTPL) CT3 – Building	89800 15124
5	Mr. Philip Monis	Head - ACMTPL	(ACMTPL) CT4 – Building	Shantivan Colony	99099 27287 02838 - 255809	4458	Mr. Ramesh Bhagat	(ACMTPL) CT4 – Building	8980048879 02838 - 255409
6	Mr. Mavji Vaghamshi	Head - ES	Tug Berth Building	Shantivan Colony	97277 84691 02838-255949	--	Mr. Kuldipsinh Zala	Tug Berth Building	9727784692 02838 - 255949
7	Capt. Sachin Srivastava	Head – Marine	Tug Berth Building	Shantivan Colony	6359883102 02838 – 255727	4629 / 4630	Capt. Divya Gupta	Tug Berth Building	6359631088 02838- 255947

8	Mr. Jawed Iqbal	Head- Railway Services	Railway Building	Shantivan Colony	98982 91000 02838 – 255763	4477	Mr. O P Sharma	Railway Building	98253 00413 02838 - 255765
9	Mr. Sujan Roy	Head – Howe	PUB Building	Shantivan Colony	77520 19112 02838 – 255581	4721	Mr. Vikas Arora	PUB Building	98792 03557 02838 - 259142
10	Mr. Arindam Goswami	Head-HR	Adani House	Shantivan Colony	90990 05899 02838 - 255723	4635 / 4636	Mr.Shashikant Patyal	Adani House	9871110840 02838 - 255164

Annexure – 14B (West Basin)

INCIDENT CONTROLLERS

Sr. No.	Incident Controller's						Runner's		
	Name	Designation	Place of Availability		Phone No.		Name & Designation	Place of Availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	2	3	4	5	6	7	8	9	10
1	Mr. Harinder Singh	Head – West Basin Port	SS-1	Shantivan Colony	90999 99260	4623 4624	Mr. Kashyap Pandya	SS-1	9925223632
2	Mr. Nirbhay Devmurari	Associate Manager	SS-1	Samudra Township	89800 15303	--	Mr. Ketan Joshi	SS-1	89800 15057
3	Mr. Bibhudatta Ray	Sr. Manager – DC	SS-1	Shantivan Colony	89800 15282	B-block	Mr. Kasulu Nagireddy	SS-1	89800 15284

Annexure – 15

DEPUTY INCIDENT CONTROLLERS

Sr. No.	Deputy Incident Controller's						Persons to be called if IC & Dy-IC both are not available.		
	Name	Designation	Place of Availability		Phone No.		Name	Place of Availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	3	4	6	7	8	9	10	11	12
1	Mr. Mahavirsinh Jhala	Manager – Dry Cargo	Tug Berth Building	Shantivan Colony	89800 15471 02838-255939	--	Mr. Mayursinh Jadeja	FCC	8980048813 02838-255987
2	Mr. K R Rao	Sr. Manager – LT	Liquid Terminal	Shantivan Colony	99252 03436 02838 - 255745	4501	Mr. Manish Jain	Liquid Terminal	98796 14715 02838 - 284419
3	Mr. Dharmendra Parmar	Associate Manager– AMCT	(AMCT) CT2-New Building	Samundra Township	8980015456 02838 - 255917	4458	Duty Superintendent	(AMCT) CT2-New Building	96876 39248
4	Mr. Hariprasad Desani	Sr. Manager – AICTPL	(AICTPL) CT3 – Building	Samundra Township	89800 15124	--	Duty Superintendent	(AICTPL) CT3 – Building	89800 48857
5	Mr. Ramesh Bhagat	Manager - AICTPL	(ACMTPL) CT4 – Building	Samundra Township	8980048879 02838 - 255409	4466	Duty Superintendent	(ACMTPL) CT4 – Building	70690 83090

6	Mr. Kuldipsinh Zala	DGM-ES	Tug Berth Building	Shantivan Colony	9727784692 02838 - 255949	4506	Mr. Devendra Dubey	Tug Berth Building	98792 03578 2838-255832
7	Capt. Divya Gupta	DGM- Marine	Tug Berth Building	Shantivan Colony	6359631088 02838- 255947	4444	Mr. Sudhakar Singh	Tug Berth Building	70690 83039 02838-255787
8	Mr. O P Sharma	AGM – Railway	Railway Building	Shantivan Colony	98253 00413 02838 - 255765	4428	Mr. Paresh Palan	Railway Building	99252 03424 02838-255787
9	Mr. Vikas Arora	DGM – Howe	PUB Building	Shantivan Colony	98792 03557 02838 - 259142	4482	Mr. M. Janoti	PUB Building	89808 02256 02838 – 255719
10	Mr. Shashikant Patyal	GM-Admin	Adani House	Shantivan Colony	9871110840 02838 - 255164	--	Mr. Supratim Sengupta	Adani House	9979855956 02838 - 255158

Annexure – 15B (West Basin)

DEPUTY INCIDENT CONTROLLERS

Deputy Incident Controller's						Persons to be called if IC & Dy-IC both are not available.		
Name	**Designation**	**Place of Availability**		**Phone No.**		**Name**	**Place of Availability**	**Phone No.**
		In Factory	**Residence Address**	**In the Factory**	**Residence**			
2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Mr. Kashyap Pandya	Senior Manager – WB	SS-1	Shantivan Colony	9925223632	4517	Mr. Nital Bhut	SS-1	89800 15358
Mr. Bibhudatta Ray	Sr. Manager - DC	SS-1	Samudra Township	89800 15282	B – Block	Mr. Kasulu Nagireddy	SS-1	89800 15284
Mr. Kashyap Pandya	Sr. Manager ES – MHS	SS-1	Shantivan Colony	97277 84692	4472	Mr. Mayur Sadhu	SS-1	8980 015121
Mr. Nirbhay Devmurari	Asso. Manager ES – MHS	SS-1	Samudra Township	89800 15303	Hostel Block	Mr. Ketan Joshi	SS-1	89800 15057

Supporting Staff of Channai Radha [Engineering Services]

Name	Designation	Place of Availability in Factory	Residence	Phone No.
Mr. Ravi V	RM – Channai Radha	Workshop	Mundra	8607700609
Mr. Tapankumar Sarkar	Operation Head - Channai Radha	Workshop	Mundra	9726412631
Mr. Mahesh Kumar	Maintenance Head – Channai Radha	Workshop	Mundra	9726418881
Mr. Arha Chakrabarty	HOS E & I - Channai Radha	Workshop	Mundra	9726429031
Mr. Lakshmanan T	Mechanical Head - Channai Radha	Workshop	Mundra	8683800531

Annexure – 16

SITE MAIN CONTROLLERS

Sr. No.	Site Main Controllers						Runner's		
	Name	Designation	Place of Availability		Phone No.		Name & Designation	Place of availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	2	3	4	5	6	7	8	9	10
1	Mr. Douglas Charles Smith	CEO	Adani House	Shantivan Colony	6357160100 02838 – 255002	4568 / 4569	Mr. Harinder Singh Head West Basin	West Basin	90999 99260 02838-252708

Annexure – 17

KEY PERSONNEL

EMERGENCY CONTACT NUMBERS

Sr. NO.	NAME	Designation	Place of Availability		Phone No		
			Factory	Residence	Land line	Residence	Mobile
1	2	3	4	5	6	7	8
1	Mr. Douglas Charles Smith	CEO	Adani House	Shantivan Colony	02838 – 255002		6357160100
2	Mr. Harinder Singh	Head - WB	SS – 01 WB	Shantivan Colony	--	4623 / 4624	90999 99260
3	Mr. Rakshit Shah	ED	Adani House	Shantivan Colony	02838 - 255001	52497	99791 21111
4	Mr. Mavji Vaghamshi	Head-ES	Tug Berth Bld.	Shantivan Colony	02838 - 255713	--	97277 84691
5	Mr. Anand R. Marathe	Head- LT	Liquid Terminal	Shantivan Colony	02838 - 255742	4459	90990 05225
6	Mr. Arindam Goswami	Head - HR	Adani House	Shantivan Colony	02838 - 255723	--	90990 05225
7	Mr. Ramde Karangiya	Head – AMCT	CT2- New Bld.	Samudra Township	02838 – 255732	4617 / 4618	90990 05240
8	Mr. Jagdish Patel	Head – AICTPL	CT3 Bld.	Samudra Township	02838 - 255733	--	89808 02599
9	Mr. Philip Monis	Head - ACMTPL	CT4 Bld.	Shantivan Colony	02838 – 255727	4629 / 4630	9100215558
10	Capt. Sachin Srivastava	Head – Marine	Tug Berth Bldg.	Shantivan Colony	02838 – 255727	4629 / 4630	6359883102
11	Mr. Bhagwat Upadhaye	Head – Dry Cargo	Tug Berth Bldg.	Shantivan Colony	02838-255870	--	98792 03599
12	Mr. Jawed Iqbal	Head - Railway	Rly. Building	Shantivan Colony	02838 – 255763	--	90999 91319
13	Mr. Dattatray Gore	Head – OHS & F	CT2- New Bld.	Samudra Township	02838-255777	--	75748 94383
14	Mr. Neeraj Kaushik	Head - Security	Adani House	Shantivan Colony	02838-255800	--	9109988165
15	Mr. Mukul Varshney	SEZ Utilities	Adani House	Samudra Township	02838-255828		6357160086

Annexure – 19

SAFE ASSEMBLY POINTS

Identification Sr. No. of the Assembly Point	Location	Accommodation Capacity	At the time of Emergency					
			Person In charge				Land line Nos.	Mobile Nos.
			Name	Designation	Place of availability			
					In the factory	Residential address		
1	2	3	4	5	6	7	8	9
Zone 1.	Terminal -1 (Sec. Gate)	100	Capt. Sachin Srivastav	Head-Marine	Tug Berth Bld.	Shantivan Colony	02838 – 255727	63598 83102
Zone 2.	CG 7	200	Mr. Dattatray Gore	Head – OHS & F	CT2 New bld.	Samudra Township	02838 – 255777	75748 94383
Zone 3.	Driver Canteen	200	Mr. Anand Marathe	Head – LT	LT	Shantivan Colony	02838 - 255742	90990 05225
Zone 4.	LT - Behind Encl-09	200	Mr. Anand Marathe	Head – LT	LT	Shantivan Colony	02838 - 255742	90990 05225
Zone 5.	Old Admin Canteen	200	Mr. Bhagwat Upadhaye	Head – Dry Cargo	Tug Berth Bld.	Samudra Township	02838 - 255870	98792 03599
Zone 6.	Rly. Buldng	200	Mr. Jawed Iqbal	Head – Rly	Rly. Buldng	Shantivan Colony	02838 – 255763	98982 91000
Zone 7.	Terminal 2 (Sec. Gate)	200	Capt. Sachin Srivastav	Head-Marine	Tug Berth Bld.	Shantivan Colony	02838 – 255727	63598 83102
Zone 8.	AMCT CT-2 (Sec. Gate)	200	Mr. Ramde Karangiya	Head – AMCT	CT2 New bld.	Shantivan Colony	02838 – 255732	90990 05240
Zone 9.	Main Gate	500	Mr. Neeraj Kaushik	AGM - Security	Main Gate	Shantivan Colony	02838 - 255800	9109988165
Zone 10.	PUB	500	Mr. Sujan Roy	Head Howe	PUB	Shantivan Colony	02838 - 255932	7752019112
Zone 11.	Adani House	200	Mr. Arindam Goswami	Head – HR	Adani House	Shantivan Colony	02838 - 255723	90990 05899
Zone 12.	Terminal – 3 (Sec. Gate)	200	Capt. Sachin Srivastav	Head-Marine	Tug Berth Bld.	Shantivan Colony	02838 – 255727	63598 83102
Zone 13.	South Basin (Sec. Gate)	500	Mr. Jagdish Patel	Head - AICTPL	CT – 03 (AICTPL)	Samudra Township	02838 - 255733	8980802599
Zone 14.	ACMTPL (Sec. Gate)	500	Mr. Philip Monis	Head – ACMTPL	CT – 04 (ACMTPL)	Samudra Township	02838 - 255809	91002 15558

Annexure – 19B (West Basin)

SAFE ASSEMBLY POINTS

Identification Sr. No. of the Assembly Point	Location	Accommodation Capacity	At the time of Emergency					
			Person In charge				Land line Nos.	Mobile Nos.
			Name	Designation	Place of availability			
					In the factory	Residential Address		
1	2	3	4	5	6	7	8	9
Zone 1	Opp. SS-1	100	Mr. Vimal Baldaniya	Sr. Engineer -ES	SS-1	---	----	89800 15123
			Mr. Jignesh Kansara	Supervisor – DC	SS-1	Mundra	02838 – 252936	99132 43060
Zone 2	Nr. Howe Office	100	Mr. Bharat Pokar	Officer – Safety	Howe office	Mundra	----	89800 15467
Zone 3	GIS	100	Mr. Ketan Joshi	AM – E & I	SS-1	Samudra Township	----	89800 15057
			Shift In charge – E & I	----	SS-1	----	----	89800 15212
Zone 4	Nr. Main Gate	100	Mr. Khadim Hussain	Junior Officer, Security	Main Gate	----	----	84609 28563
			Security Shift Incharge	----	Main Gate	----	02838 – 252900	97277 84645
Zone 5	Approach-3	100	Mr. Kashyap Pandya	Sr.Mgr – MHS	SS-1	Shantivan Colony	02838 – 255973	99252 23632
			Mr. Bibhudatta Ray	Sr.Mgr. – DC	SS-1	Samudra Township	02838 – 255924	89800 15282
Zone 6	Amenities Building	100	Mr. Narendrasinh Jadeja	Senior Engineer, ES	SS-1	Shantivan Colony	02838 – 2562381	89800 16461
			Mr. Paresh Gadhavi	Assistant-Admin	SS-1	Mundra	02838 – 255969	89800 16462

Annexure – 21

Fire & Toxicity Control Arrangements

Fire Water & Other sources	Nos. of Reservoir	02 (U/G water reservoir)	Nos. of Tanks	04 (O/H water storage tank)	Total Quantity				19358 KL	Nos. of CO2 Extinguishers
	No. of hydrant Points	No. of fire pumps, type & Capacity	No. of hose reals & Total Length	No. of fire tenders and capacity	No. of Sprinklers/Monitors					
					Fixed		Portable		Alternative power arrangement	
					Lifting height	Pressure	Lifting height	Pressure		
1	2	3	4	5	6	7	8	9	10	11
Sea Water & Narmada water	385	Diesel pump: 06 no. – 273 M^3/hr 02 no. – 410 M^3/hr 02 no. – 616	60 mtr lengths – 30 nos.	04 no. fire tender	60 mtr horizontal & 40 mtr vertical throw	7 kg/cm^2	60 mtr horizontal & 40 mtr vertical throw	7 kg/cm^2	Diesel Generator backup	500 Nos.

		M^3/hr Electric pump: 03 no. – 273 M^3/hr 02 no. – 410 M^3/hr 04 no. – 616 M^3/hr 01 no. – 100 M^3/hr Jockey pump: 06 no. – 20 to 40 M^3/hr 01 no. – 96 M^3/hr		Capacity: 1) Water tender – 6 KL Water 2) Foam tender 01 - 6 KL Water & 3 KL Foam 3) Foam tender 02 - 5 KL water & 1 KL foam 4)Multipurpose fire tender - 8 Kl Water - 3 KL Foam - 45 Kg CO2 - 150 Kg DCP					

Dry Powder Type		Foam Type		Water Jet Product		Other Extinguisher		Personal protective equipments			
								Respiratory		Non-respiratory	
Type of powder & total quantity	No. of portable Extinguisher	Type of foam & total quantity	No. of portable Extinguisher	No. & size of blankets	Other Jet products	Type	Number or Quantity	Type	No.	Type	No.
12	13	14	15	16	17	18	19	20	21	22	23
Sodium bicarbonate; 2000 kg	700 Nos.	AFFF & AR-AFFF 28 KL with system & 2 Kl storage	08 Nos.	163 cm X 152 cm 04 nos.	Nil	Nil	Nil	1) Self-Contained Breathing Apparatus Set 2) Airline Self-Contained Breathing Apparatus Set	1) 12 nos. 2) 01 Nos.	Safety Helmet Gumboot	50 nos. 25 Nos.

Annexure – 21B (West Basin)

Fire & Toxicity Control Arrangements

Fire Water & Other sources	Nos. of Reservoir	00 (U/G water reservoir)	Nos. of Tanks	02 (O/H water storage tank)	Total Quantity				1100 KL	Nos. of CO_2 Extinguishers
	No. of hydrant Points	No. of fire pumps, type & Capacity	No. of hose reals & Total Length	No. of fire tenders and capacity	No. of Monitors 101 nos.				Alternative power arrangement	
					Fixed [99]		Portable [02]			
					Lifting height	Pressure	Lifting height	Pressure		
1	2	3	4	5	6	7	8	9	10	11
Sea Water & Narmada Water	Reservior capacity is 1100 KL Nos. of Hydrant 122	Diesel pump: 01 no. – 273 M^3/hr Electric pump: 02 no. – 273 M^3/hr Jockey pump: 02 no. – 10.8 M^3/hr	15mts lenghs – 250 nos.	01 no.	30 mtr head	7 kg/cm^2	20 mtr head	7 kg/cm^2	Diesel Generator backup	2Kg – 36 4.5Kg – 128
				Capacity: 1) 5 KL water						

Dry Powder Type		**Foam Type**		**Water Jet Product**		**Other Extinguisher**		**Personal protective equipment**			
Type of powder & total quantity	**No. of portable Extinguisher**	**Type of foam & total quantity**	**No. of portable Extinguisher**	**No. & size of blankets**	**Other Jet products**	**Type**	**Number or Quantity**	**Respiratory**		**Non-respiratory**	
								Type	**No.**	**Type**	**No.**
12	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
Sodium bicarbonate; 700 kg	2Kg – 62 5Kg – 15 9Kg – 44 10 Kg – 16 50Kg – 4	AFFF 200 liter	9 Ltr – 7 45 Ltr – 5	01 no.	Nil	Water CO2 type	9 Ltr – 5	Self-Contained Breathing Apparatus Set	03 no	• Safety Helmet • Gumboot • Fire Proximity Suit	25 no. 20 no. 01 no.

Mutual Aid Arrangement											
Name & Address of the factories & Fire stations	**Approx. distance**	**Contact**		**FFE available**		**PPE available**		**No. of experts & trained persons available**	**Decontamination substances available**	**Gas detectors available**	**Other equipments availabl e**
		Person	**Phone No.**	**Type**	**Quantity**	**Type**	**Quantity**				
24	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Indian Oil Corporation Limited, Mundra-Panipat Pipeline, Post Box No. – 1, P.O. Mundra, Old Port Road, Mundra, District – Kutch, Gujarat, PIN-370421.	**12 km**	**Mr. Satosh kumar / Mr. Fate kumar**	**967210 211 / 904106 9414**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
Hindustan Petroleum Corporation Limited, Mundra-Delhi Pipeline, P.O. Mundra, IOCL Link Road, Mundra, District – Kutch, Gujarat, PIN-370421.	**06 km**	**M R Chauhan / Mr. Surabh bhatt**	**992017 3377 / 968760 6093**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
Jindal SAW Ltd. (IBU), Village – Samaghoga, Taluka – Mundra, District – Kutch, Gujarat, PIN-370421.	**28 km**	**Mr Girish Kumar / Mr Dipak Kumar**	**900595 8965 / 968767 8052**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

Adani Power Limited, Adani Power Site, Tunda-Wandh, Mundra-Mandvi Highway, Siracha, Mundra, District – Kutch, Gujarat, PIN-370435.	**25 km**	**Mr. Anil C Datar / Mr. Dinesh Mishra**	**968766 0356 / 789440 6485**	--	--	--	--	--	--	--	--
Costal Gujarat Power Limited, Ultra Mega Power Project, Tunda Vandh Road, Tunda Village, Mundra, District – Kutch, Gujarat, PIN-370435.	**28 km**	**Mr. Pramod Singh /Mr. Jignesh Kumar**	**922729 5495 / 909999 5701**	--	--	--	--	--	--	--	--
Hindustan Mittal Energy Limited Plot no.06 (2), Old port road, Mundra, District -Kutch Gujarat, PIN-370435.	**06 Km**	**Mr Partha Chakrvaborty / Mr. Vipin Yadav**	**989960 0434 / 706900 2406**	-	-	-	-	-	-	-	-

Annexure – 22

Medical Arrangements

First-aid Centers / Ambulance room / OHC / Hospital								Ambulance van or alternate arrangement				
Sr No.	Name & Location	Phone No.	In charge person			Facilities & equipments	Antidotes available	First aiders available	Place of availability	Capacity	Facilities in the van	Driver's name & Address
			Name & Designation	Residence								
				Phone	Address							
1	2	3	4	5	6	7	8	9	10	11	12	13
1	OHC – NR. LT APSEZ LTD	02838 255710 89800 15070	On Duty Dr.	8511078 199	Samdra Township	All equipments as per Factory Act 1948	All Antidotes are available	24 Hours 1.Sanajy Rathod 2. Ashok K. Soni 3. Subash Moond 4. Gulam Khatri 5. Radheshyam 6. Deepu Sharma 7. Dindayal Sharma	OHC – Nr. LT APSEZ LTD	4 Bed capacity	All equipments as per Factory Act 1948	1.Bharat Dhafada (Gundala-Mundra-9925203405) 2.Bhavesh L Maheshwari 3.Nizar Ali 4.Jaspal Zala 5.Jitendra Gadhvi 6.Ashish Anshora 7.Jitubha Zala 8.Bhavesh A Maheshwari 9.Yogendrasinh

2	Adani Hospital, Samundra Township, Old Bander Road, Mundra Kutch	02838 - 255899	Dr. Vatsal Pandya	8980802842	Samundra Township	ICU on Wheel, X ray, Sonography, Physiotherapy, Laboratory, Pharmacy and telemedicine etc.	All Antidotes are available	Adani Hospital Staff	In APSEZ near samundra Township	100 Bed capacity	All equipments as per Factory Act 1948	Mr. Vinay Pratap Singh 9099858095

Annexure – 22B (West Basin)

Medical Arrangements

First-aid Centers / Ambulance room / OHC / Hospital								Ambulance van or alternate arrangement				
Sr No.	Name & Location	Phone No.	In charge person			Facilities & equipment	Antidotes available	First aiders available	Place of availability	Capacity	Facilities in the van	Driver's name & Address
			Name & Designation	Residence								
				Phone	Address							
1	2	3	4	5	6	7	8	9	10	11	12	13
1	OHC – Nr. SS-1 Building	02838-255984 8980015155	Medical Officer	96876 39281	Samudra Township	All equipment as per Factory Act 1948	All Antidotes are available	24 Hours 1.Sanajy Rathod 2. Ashok K. Soni 3. Subash Moond 4. Gulam Khatri 5. Radheshyam 6. Deepu Sharma 7. Dindayal Sharma	OHC – Nr. SS-1 Building	consulting	All equipment as per Factory Act 1948	1.Bharat Dhafada (Gundala-Mundra-9925203405) 2.Bhavesh L Maheshwari 3.Nizar Ali 4.Jaspal Zala 5.Jitendra Gadhvi 6.Ashish Anshora 7.Jitubha Zala 8.Bhavesh A Maheshwari 9.Yogendrasinh

2	Adani Hospital, Samundra Township, Old Bander Road, Mundra Kutch	02838-255899	Dr. Vatsal Pandya	8980802842	Samundra Township	ICU on Wheel, X ray, Sonography, Physiotherapy, Laboratory, Pharmacy and telemedicine etc.	All Antidotes are available	Adani Hospital Staff	In APSEZ near samundra Township	100 Bed capacity	All equipments as per Factory Act 1948	Mr. Vinay Pratap Singh 9099858095

Annexure – 23

TRANSPORT & EVACUATION ARRANGEMENT

Type of siren, if any, for evacuation	**Steam & Electrical hooter type siren**

Own Transport Center					**Own Vehicles**				
Name of Location	Phone No.	In charge person			Sr. No.	Type & No.	Capacity	No & Type of public warning instruments	Driver's name & Address
		Name & Designation	Residence						
			Phone	Address					
Mundra	9909927251	Mr. Archan Bhat	9909927251	Mundra	**During Day Time (0730 hrs. to 1830 hrs.)**				
					1	HMV	56 seater x 8 54 Seater x 13	Nil	All drivers available
					2	LMV	7 seater x 25 (Available at different location)		
					During Night Time (1830 hrs. to 0700 hrs.)				

					1	HMV	56 Seater x 3 (at SVC)	Nil	Naran, Rupsinh, Tulsi Vijay raj, Mulji, Mintoo, Satendra, Pravin, Kapil, (All available at Port, SVC and Drivers Rest room)
					2	HMV	13 Seater x 2 (at CT 2 & CT3)		
					3	LMV	7 seater x 30 (Dry Cargo – 01, LT – 02, CT 2 – 04, Engg. Service – 01,Marine-03,Safety-01, Fire-01, Railway-01, Security-16)		
					4	Ambulance	05 (02 at Port, 01 WP, 01 SEZ, 01 at SVC)		

Outside shelters for evacuated persons							
Sr. No.	Name, address & distance	Phone. No.	In charge Person			Accommodation capacity	Facilities available
			Name & Designating	Residence			
				Phone	Address		
11	12	13	14	15	16	17	18
1	Shantivan Colony	09727721638	Mr. Shashikant Patyal	9871110840	Shantivan Colony	1500	Open ground available at SV Colony (Cricket ground and Rang Manch), Shopping Complex available
2	Samundra Township	09727721638	Mr. Shashikant Patyal	9871110840	Samundra Township	2500	Open ground available at Samundra Township(Children Park and utility park), Shopping Complex available

Annexure – 24

POLLUTION CONTROL ARRANGEMENTS

Water Pollution Control			**Air Monitoring**				
Type & Capacity of effluent treatment plant	No. of sample monitoring & its frequency	In charge person's name, address & Phone No.	No. of sample monitoring & its frequency	Type & parameters of tests	Wind direction	Instrument available.	In charge person's name, address & Phone No.
1	**2**	**3**	**4**	**5**	**6**	**7**	**9**
265 KLD	2 sample per month	Mr.Anand R Marathe CTF Building, Liquid Terminal, APSEZ 90990 05225 (M)	Twice a Week	Type Ambient Air Monitoring Parameters PM 10, PM 2.5, SO2, NOx, CO, Hydrocarbon, Benzene	Wind vane	Respirable Dust Sampler & Fine Particulate Dust Sampler	Mr.Anand R Marathe CTF Building, Liquid Terminal, APSEZ 90990 05225 (M)

Stack Monitoring				**Scrubbers, Incinerators etc.**				**Land Pollution Controls**		**Pollution control Board**	
No. of sample monitoring & its frequency	Type & parameters of tests	Instrument available.	In charge person's name, address & Phone No	Location	Type & Capacity	For What	In charge person's name, address & Phone No.	No. of sample monitoring & its frequency	In charge person's name, address & Phone No.	Permission obtained?	Conditions fulfilled?

11 sample per month	SO_2, NOx, SPM	Stack Monitoring kit.	As above	---------- N A ----------	2 sample per month	As above	Yes (As per CC&A)	Yes (As per CC&A)

Annexure –26

ALARMS & SIRENS

Sr. No.	Plant wise alarm points						The alarm (signal) is heard (seen) at	Sound difference if any			
	Plant/Dept./Location		Sr. No. of the alarm point	Its place of location (With floor No. if any)	Type of the alarm of siren	Its Period of checking		Type of emergency	Type of alarm or siren	Duration of sounding	Type of sound of alarm /siren
	Name & Location	No. of floor									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	Liquid Terminal	1) LT Control room, 2) Ground floor of LT office	1 & 2	Roof of the first floor	Wailing	Twice in a month	5 km range	All Type of Emergency	Hooter	As per siren code	Wailing
2	Dry Cargo area	Ground floor	3	Roof of fire pump house	Wailing	Twice in a month	5 km range	All Type of Emergency	Hooter	As per siren code	Wailing
3	Marine Terminal	Ground floor fire p/h	4	Roof of Marine Terminal building	Wailing	Twice in a month	5 km range	All Type of Emergency	Hooter	As per siren code	Wailing
4	Adani House	Ground floor	5	Each floor	Wailing	Twice in a month	500 mtr range	All Type of Emergency	Hooter	As per siren code	Wailing

5	PUB Building	Ground floor	6, 7 & 8	Each floor	Wailing	Twice in a month	500 mtr range	All Type of Emergency	Hooter	As per siren code	Wailing
6	ES - Building	Ground floor	9	Roof of ES building	Wailing	Twice in a month	8 km range	All Type of Emergency	Hooter	As per siren code	Wailing
7	AMCT / CT2	Ground floor fire P/H	10	Ground floor	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hooter	As per siren code	Wailing
8	Terminal-2	Ground floor fire P/H	11	Ground floor	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hooter	As per siren code	Wailing
9	AICTPL / CT2	Ground floor fire P/H	10	Ground floor	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hooter	As per siren code	Wailing
10	ACMTPL / CT2	Ground floor fire P/H	10	Ground floor	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hooter	As per siren code	Wailing

Annexure –26B (West Basin)

ALARMS & SIRENS

Sr. No.	Plant wise alarm points						The alarm (signal) is heard at	Sound difference if any			
	Plant/Dept./Location		Sr. No. of the alarm point	Its place of location (With floor No. if any)	Type of the alarm of siren	Its Period of checking		Type of emergency	Type of alarm or siren	Duration of sounding	Type of sound of alarm /siren
	Name & Location	No. of floor									
1	2	3	4	5	6	7	8	9	10	11	12
1	SS-1	Top floor	1	Roof of SS-1 building	Wailing (Electric)	Twice in a month	8 km range	All Type of Emergency	Hooter	02 minute (all clear)	Wailing
2	Fire Dept.	Ground floor	1	Fire porta cabin	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hooter	02 minute (all clear)	Wailing

Code of Siren:

- **Emergency** : Wailing Siren continuous for one minute with gap Siren for one minute followed by five second gap. Repeated four times.
- **Testing** : Continuous Siren for one minute (4th and 19th of Every Month at 1100 hrs.).
- **All Clear** : Continuous Siren for two minutes.

Annexure – 27

INTERNAL PHONES

Sr. No.	Name & Location of the plant, departmen of area (including internal emergency service)	Phone No. (Internal)	Person available on this phone				
			Name	Designation	Designation or duty under on-site / offsite emergency plan, if any.	Residence	
						Phone No. (Internal)	Address
1	2	3	4		6	7	8
1	TELEPHONE EXCHANGE	99	SHIFT INCHARGE	SR.OFFICER	MR. PRADEEP TRIVEDI	4258	SHANTIVAN COLONY
2	FIRE CONTROL ROOM	52801	SHIFT INCHARGE	FIRE OPERATOR	MR. RAKESH CHATURVEDI	4731	SAMUDRA TOWNSHIP
3	MEDICAL	52710	INCHARGE	MEDICAL OFFICER	MEDICAL OFFICER	--	--
4	SECURITY	52300	DUTY OFFICER	OFFICER	MR. NEERAJ KAUSHIK	4504	SHANTIVAN COLONY
5	MARINE CONTROL	52761	SHIFT INCHARGE	HEADMARINE	CAPT. SACHIN SRIVASTAVA	4629 / 4630	SHANTIVAN COLONY
6	SAFETY OFFICER	52777	SAFETY OFFICER	SAFETY OFFICER	MR. DATTATRAY GORE	--	SAMUDRA TOWNSHIP
7	LT CONTROL ROOM	52744	SHIFT INCHARGE	AVP	MR. ANAND MARATHE	4459	SHANTIVAN COLONY
8	DRY CARGO	52932	SHIFT INCHARGE	HEAD-DC	MR. BHAGWAT UPADHAYE	--	SAMUDRA TOWNSHIP
9	ELECTRICAL & ISTR.	52826	SHIFT INCHARGE	AGM	MR. MAVJI VAGHAMSHI	4506	SHANTIVAN COLONY
10	PORT OFFICE CONTROL	52762	SHIFT INCHARGE	HEAD MARINE	CAPT. SACHIN SRIVASTAVA	4629 / 4630	SHANTIVAN COLONY

Annexure – 27B (West Basin)

INTERNAL PHONES

Sr. No.	Name & Location of the plant, department of area (including internal emergency service)	Phone No. (Internal)	Person available on this phone				
			Designation or duty under on-site / offsite emergency plan, if any.	Designation	Name	Residence	
						Phone No. (Internal)	Address
1	2	3	4	5	6	7	8
1	TELEPHONE EXCHANGE	99	SHIFT INCHARGE	SR.OFFICER	MR. PRADEEP TRIVEDI	4181	Shantivan Colony
2	FIRE CONTROL ROOM	52900	SHIFT INCHARGE	AGM	MR. RAKESH CHATURVEDI	4731	Samudra Township
3	MEDICAL	52984	INCHARGE	MEDICAL OFFICER	---	4460	Shantivan Colony
4	SECURITY	52939, 52900	DUTY OFFICER	SR.MANAGER	MR. NEERAJ KAUSHIK	--	Shantivan Colony
5	MARINE CONTROL	52933	SHIFT INCHARGE	GM	CAPT. SACHIN SRIVASTAVA	4726	Shantivan Colony
6	LT CONTROL ROOM		SHIFT INCHARGE	AGM	MR. ANAND R MARATHE	4459	Shantivan Colony
7	DRY CARGO	52936	SHIFT INCHARGE	MANAGER	MR. BIBHUDATTA RAY	4439	Samudra Township
8	ELECTRICAL & INS.	52932	SHIFT INCHARGE	DGM	MR. KASHYAP PANDYA	4506	Shantivan Colony
9	CENTRAL CONTROL ROOM	52932	SHIFT INCHARGE	DGM	MR. KASHYAP PANDYA	4044	Shantivan Colony

Annexure – 28

EXTERNAL PHONES

Sr. No.	Name & Address of the dept. / Service / Person (including external emergency services)	Phone No. (External)	Person available	
			Designated person	Services Expected Under On-site / off –site Emergency plan
1.	Bhuj Fire Station	02832 – 222590, 101	Fire Officer	Fire fighting Service
2.	Gandhidham Fire Station	02836-231610, 101	Fire officer	Fire fighting Service
3.	Fire & Ambulance serv.	108	Medical Off.	Fire fighting Service
4.	Kandla Fire Station	02836 - 270176, 270178	Chief Fire Off.	Fire fighting Service
5.	Factory Inspector	02836 – 260020, 260262	Asst. Director	Legal Advisory Service
6.	Collector Office	02832 – 250020, 251805	Collector	Administration Service
7.	Civil Defense	02832-220703	Dy. Collector	Evacuation Service
8.	Hospital, Bhuj	02832 – 221610, 250150	Civil Surgeon	Medical Service
9.	KPT- Hospital, Kandla	02836- 270205, 270633	Medical officer	Medical Service
10.	Police	02832 -250511, 250444	DSP	Law & Order
11.	Police control City	100	Control room	Law & Order
12.	Gujarat Maritime Board	02838-22136	Port Off.	Marine Service
13.	Indian Navy, Porbandar	0286-2240954	Navy Officer	Security service (WAR)
14.	Indian Coast Guards	02831-286430,31(Jhakhau) 0286-2240958 (Porbandar)	Cost Guard officer	Security service

Annexure – 29

NOMINATED PERSONS TO DECLARE MAJOR EMERGENCY

Sr. No.	Name of the plant, department or location	Name & Designation of the nominated persons to declare major emergency	Duty of designation given, if any, under the onsite / off-site emergency plan	Phone No.	Residence	
					Phone No.	Address
1	Mr. Douglas Charles Smith	CEO	Site Main Controller	02838 – 255002	63571 60100	Shantivan colony
2	Mr. Harinder Singh	HEAD - West Basin	Site Main Controller	02838-252708	90999 99260	Shantivan colony

Annexure – 14

Expense Details for Fisherfolk Amenitites work in different core areas Till Sep'21									
Sr.	**Details**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**April -Sep-21**	**TOTAL**	**AMT IN LACS**
	Expenditure Details (Amount in Rs.)								
1	Vidya Deep Yojana	2069300	193000	2087000	1771000	110225	--	6230525	62
2	Vidya Sahay Yojana	552580	495000	691000	708000	504336	622889	3573805	36
3	Adani Vidya Mandir – Shaping Lives	4200000	4030000	3472000	6434020	1593805	1265000	19729825	197
4	SENIOR CITIZEN HEALTH CARD	--	8430000	1750000	2975000	1750000	--	14905000	149
5	FINANCIAL SUPPORT TO POOR PATIENTS	4439507	1275000	813000	1296063	763800	450000	9037370	90
6	Machhimar Kaushalya Vardhan Yojana	188708	200000	397000	73000	--	--	858708	9
7	Machhimar Sadhan Sahay Yojana	--	--	315000	522000	--	--	837000	8
8	Machhimar Awas Yojana	4592106	1165000	--	2311000	2424016	--	10492122	105
9	Machhimar Shudhh Jal Yojana	2236050	2700000	2038000	1773000	2348300	573275	11668625	117
10	Sughad Yojana	1367300	170000	--	192000	30000	--	1759300	18
11	Machhimar Akshay kiran Yojana	860850	100000	68000	--	--	--	1028850	10
12	Machhimar Ajivika Uparjan Yojana-Mangroves plantation	1558800	500000	1382000	1400000	1900272	1914432	8655504	87
13	Bandar Svachhata Yojana	106400	50000	--	--	367000	--	523400	5
14	Cricket league and Cycle Marathon	432000	657119	638000	610800	--	--	2337919	23
15	Sports Material For Children & Youth at Vasahats	197797		--	--	--	--	197797	2
16	New Pilot Initiative for Polyculture	398240	160000	--	--	--	--	558240	6
17	New Pilot Initiative for Cage farming Asian Seabass & Lobster	864000	660000	--	--	--	--	1524000	15
18	Sea Weed Culture Project	--	--	--	200000	--	--	200000	2
19	Mangrove Biodiversity Project	--	--	1890000	684000	499210	--	3073210	31
20	Approach road restoration at 9 vasahat	--	--	--		599000	--	599000	6
		24063638	**20785119**	**15541000**	**20949883**	**12889964**	**4825596**	**97790200**	**978**

Annexure – 15

Compliance Report of CIA Study Environment Management Plan

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
1	**Land Use Change**						
1.1	It is predicted that the built up land in the rural areas would increase by an order 50% from the baseline 2015. New settlements near the SEZ area might create slums. Unorganized urban development leading to poor sanitation and proliferation of vectors and disease.	Level - 1	APSEZ has developed two townships (Shantivan and Samudra) presently accommodating 1668 households. Necessary permissions from concerned authorities were already obtained for the development of townships and Associated infrastructure facilities.	The existing townships will be expanded to accommodate about 4 lakh people when the APSEZ is fully developed.	APSEZ	As and when Required	APSEZ has developed two townships (Shantivan and Samudra) accommodating 2180 households and associated infrastructure facilities. Accommodation is made available for all interested employees working within Adani group & SEZ industries. Out of which 88% Occupancies are accommodated within the townships and rest are available for employees working within APSEZ. At present 60 nos. of industries (processing & non-processing) are present within the SEZ (45 nos. are in operation). Township facilities are also made by some of SEZ industries within Mundra town for their employees with basic infrastructure facilities and requirements. Most of the employees working in SEZ industries are residing in Mundra township having all basic requirements and associated facilities. The existing social infrastructure facilities are adequate for present development at APSEZ. The existing townships with associated facilities will be expanded as per requirement. APSEZ has also been granted permission for receiving domestic sewage @ 2.5 MLD from Mundra village (which was earlier discharged into open area within Mundra region)

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
							in to wastewater treatment plant for treatment and disposal. APSEZ has already started receiving of domestic sewage from Mundra, which abates the poor sanitation and unhygienic condition within Mundra region. Total project cost for laying domestic sewage underground pipeline with other associated facilities from Mundra to APSEZ is 362 Lacs.
1.2	Once the project is fully developed, due to increase in built up land in the APSEZ area, there will be an increase in the storm water runoff from the facility.	Level-1	The study area experiences scanty rainfall less than 400 mm/year. Considering the natural gradient, ASPEZ have designed and implemented storm water drains in the existing facility to meet the peak daily rainfall of 440 mm/hr. Hence flooding of	Technical feasibility study can be carried out to explore the possibility of developing storm water collection ponds to utilize maximum possible storm water runoff for dust suppression in the coal yard areas during non-rainy days.	APSEZ	Technical Study - one time, Implementation - Continual process	Presently, ~40% of the total SEZ is developed. Based on technical studies, APSEZ has developed adequate storm water facilities that meets with daily demand as per recorded highest rainfall. At present all existing coal yards are designed with drain, for collection of water during water sprinkling and rainfall, which is carried away to dump pond. Supernatant water from dump pond is being collected and used for dust suppression activities or after sedimentation, discharged to sea. Details of drain and dump pond has been submitted in along with EC compliance report (Oct 19 to March 20). Analysis of said water discharging into sea during monsoon season is being carried out (twice in a year during monsoon) through NABL / MoEF&CC accredited laboratory. Analysis report of the same shows there is no any contamination. The report is attached herewith as **Annexure – i**. During compliance period April 2021 to Sept 2021, the maximum recorded rain fall was **85.4 mm/hr** observed, which was much less than the design capacity of existing storm water drainage system. So our existing storm water management facility is adequate to handle the storm water

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			water in the neighboring areas is not envisaged.				runoff from the area. Hence flooding of water in the neighboring areas is not envisaged.
			As per the directions given in the environmental clearance issued for the proposed Multi-Product SEZ and CRZ clearance for Desalination, sea water intake, outfall facility and pipeline project, the master plan of the project was designed and being implemented without disturbing the natural flow of rainwater	The channel depth in all the natural streams shall be maintained to accommodate peak flood flow during the monsoon and periodical de-silting activities in the natural steams passing through the APSEZ area	APSEZ, District Administration* and Irrigation department	As and When Required	Presently there is no Desalination plant, sea water intake and outfall facility developed as part of EC & CRZ clearance of Multiproduct SEZ. The project will be designed and implemented as per requirement without disturbing the natural flow of rainwater in all the seasonal streams.

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			in all the seasonal streams.				
1.3	Due to conservation and protection of mangroves in the designated conservation area, it has been predicted that the current mangrove footprint area would marginally increase in next 15 years due to natural growth. This will enhance the overall biodiversity in the local coastal eco-	Positive Impact with ecological benefits	In addition to conservation of the identified 1254 ha mangrove areas around Mundra port and SEZ, APSEZ has taken up large scale mangrove afforestation activities in an area of more than 2800 ha at various locations across the coast of Gujarat state in consultation with various organizations	APSEZ will continue mangrove afforestation as per the commitment made with concerned regulatory authority	APSEZ	Short Term	APSEZ has carried out mangrove afforestation in 2890 ha. area across the coast of Gujarat till date. No further mangrove afforestation is pending w.r.t. commitment made with concerned regulatory authority for APSEZ, Mundra project. As per study conducted by NCSCM, Chennai in 2017, mangrove cover in and around APSEZ, Mundra has increased from 2094 Ha to 2340 ha (as compared between 2011 to 2017). The analysis has shown an overall growth of 246 ha. The cost for said study was INR 3.15 Cr. Recently study was carried out in the year 2019 and based on that there is an increase of mangrove cover between **March 2017 (Total 2340) and September 2019** with an extent of **256 Ha (Total 2596 Ha Area)** which is about **10.94%** rise in growth rate, also It reveals that the mangrove and the tidal system in the creeks remained undisturbed over this period. Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is **502 Ha** between 2011 and 2019. Analysis of data between categories indicated that there was an **increase in dense mangroves** along with the conversion of scattered into sparse, that shows the growth

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td>system.</td><td></td><td></td><td></td><td></td><td></td><td>of mangroves in a progressive direction.

As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.
<table>
<tr><th>Sr. No.</th><th>Recommendations</th><th>Compliance</th></tr>
<tr><td>1.</td><td>Mangrove mapping and monitoring in and around APSEZ</td><td>• APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island.
• As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 & 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.7%.
• This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion of scattered to sparse which</td></tr>
</table></td></tr>
</table>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance		
									also shows that the growth of mangroves in a progressive direction. • Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019. • The cost of the said study was INR 23.56 Lacs incurred by APSEZ.
							2.	Tidal observation in creeks in and around APSEZ	• APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM. • The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves. • The cost of the said activity was INR 1.0 Lacs.
							3.	Removal of Algal and Prosopis growth from mangrove areas	• Algal and Prosopis growth monitoring was done in and around mangrove area and algal encrustation was found in some of the mangrove areas, which has been removed manually. • The cost of the said activity was INR 1.2 Lacs.
							4.	Awareness of mangroves	• Adani Foundation – CSR Arm of Adani group has done

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								importance in surrounding communities	awareness camps/activities created in the community regarding importance of mangroves. • Adani Foundation has also provided 8.95 lacs kg Dry Fodder and 24.25 lacs kg Green fodder in 21 villages of Mundra and Anjar Block to support the resource dependent villagers, to avoid their dependency on mangroves. The expenditure for fodder supporting activities was approx. 122.7 Lacs during FY 2021-22 (Till Sep'21). • Village Gauchar land development for the fodder cultivation to made fodder sustain village & Avail green fodder in scarcity phase. With the support of Gauchar Seva Samiti Grassland development in Siracha – 85 Acre & Zarpara – 25 Acre done which resulted in total production of 82 ton. • Other than this dedicated security guard with gate system deployed by APSEZ across the coastal area and no any unauthorized persons allowed within coastal as well as mangrove areas. • Refer CSR report attached as **Annexure – 1**.

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							Other than this Adani Foundation – CSR Arm of Adani Group at Mundra-Kutch has initiated multi-species plantation of mangroves in Luni village in association with GUIDE, Gujarat. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. Current year 3 ha development is planned to multi-species mangrove plantation.
1.4	Development activities along the coast might cause certain changes in hydro-dynamic characteristics along the shoreline. Shoreline of any area also can be influenced by storm surges and other natural processes.		Detailed hydro-dynamic modelling and shoreline change prediction for a fully developed APSEZ facility has been studied. The study reveals that the erosion and accretion in the study area at the end of 15th year will be within the designated	It is recommended to map the coastal morphology (Shoreline) at least once in three years	APSEZ	Continual Process	Shore line change study was carried out by M/s. Chola MS, Chennai (NABET accredited consultant) as a part of Waterfront Development Project – Expansion EIA study. The summary of the said study is as below. To estimate the shoreline change due to the earlier approved waterfront development plan, a historical shoreline change assessment has been undertaken using the satellite imagery for a period of 2008 to 2018. In order to avoid any major errors in estimating the shoreline, the satellite data for similar tidal condition was considered for 2008, 2013 and 2018. AMBUR Methodology was used to study the historical analysis 10km radius stretch of shoreline on either side of the APSEZ project boundary has been considered for assessing the historical shoreline change scenario. The baseline shoreline change assessment depicts the influence of both natural causes and also possible changes in the shore due to various development activities in the study area during the designated period. For the purpose of this study, shoreline on left side of APSEZ is termed as West Side Shoreline and that of the right side as East Side Shoreline for ease of recognition.

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			criteria of ± 0.5 m/year. which reconfirms that the waterfront development activities of APSEZ would pose insignificant impact on the Mundra shoreline.				The maximum accretion and erosion rate of the west side shoreline over a period of 10 years during the year 2008 – 2018 are observed to be 4.78 m/yr and 1.93 m/yr respectively. The maximum accretion and erosion rate of the east side shoreline over a period of 10 years during the year 2008 – 2018 are observed to be 0.5 m/yr and 0.82 m/yr respectively. However, next shoreline assessment study will be conducted in FY 2021-22.
2	**Regional Traffic Management Plan**						
2.1	The projected traffic data as per the EIA Report of Multi-Product Special Economic Zone, the peak vehicular traffic from the port and SEZ	Level-1	As per the master plan of APSEZ, eight artillery roads will be connected to either state highway or national highway for evacuating the goods from APSEZ. None of these roads	Additional road as per master plan will be built in future based on the overall progress of the project. Currently about 25% of cargo from APSEZ is transported by Rail and the same will be	APSEZ	As and When Required	Presently, ~40% of the total SEZ is developed. Based on technical studies, APSEZ has developed adequate storm water facilities that meets with daily demand as per recorded highest rainfall. Existing road/rail/conveyer infrastructure facilities are adequate to evacuate the existing cargo. Further, APSEZ's cargo evacuation through rail / conveyer / pipeline has increased to ~40 %, thereby reducing the usage of road. Additional road facilities will be built as per master plan considering future development. The facilities for transportation of cargo other than road will be enhanced considering future development, which will reduce the traffic volumes on the regional road Network.

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	operations (including supporting facilities and colony) could be in the order of 18,300 and 10,400 vehicles per day respectively. There could be a possible increase in traffic congestions on village-highway intersections and road accidents.		are passing through settlements, thereby avoiding traffic Congestions in the respective villages. The carrying capacity of the eight artillery roads connecting APSEZ is estimated to be about 16,000 PCU/hr as against the envisaged peak traffic volume of 4,500 PCU/hr. Out of eight artillery roads considered in	enhanced to 40% when the facility is fully developed in future. This will further reduce the traffic volumes on the regional road network.			

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			APSEZ master plan, seven roads were already developed and functional.				
			APSEZ has been imparting Driver Training Programs to all their contractors to enhance awareness on road safety.	APSEZ can undertake technical feasibility of implementing Intelligent Transport System (ITS) for the freight carriers associated with their development activities.	APSEZ & GSRDC*	Long Term	APSEZ is being imparting the regular in-house classroom and on-job training to all drivers and employees on below topics: • Basic induction Training for drivers • ITV Driver Training • ITV Driver Induction for Supervisor • Defensive Driving for LMV & HMV • Defensive Driving & BBS • Driver Assessment • Road accident & rescue • Traffic Management & Road Signage • Driving safety training • RORO Driver training • Road Safety • Defensive Driving & Emergency Action Plan • Drivers Responsibilities & Safe driving • Emergency Rescue (Vehicle) Training Approx. 2460 Participants (On roll and contractual manpower) were benefitted from above trainings in compliance period April 21 to Sept 21. The same will be continued in future also.

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							APSEZ has also implemented the Remote traffic management system (RTMS) to manage the traffic movements and capturing the violations to further improve the system. Following steps were taken by APSEZ to reduce the accidents. ✓ Installation of approx. 100 Nos. of cameras which is being operated at ISCR (Integrated security control room) to monitor & manage the traffic system in APSEZ on real time basis. ✓ Installation of 05 Nos. RTMS - Remote traffic management system (having combination of Radar + OCR camera + LED display board - showing speed limit) to recognize the over speeded vehicles, so that timely capture the same and avoid any road accidents. ✓ Display of signboards at roadsides and various places within APSEZ, Mundra. ✓ Monitoring of vehicle speed through speed gun by security personnel on daily basis.
3	**Water resources Management and sewage treatment & disposal Plan**						
3.1	For a fully developed APSEZ facility, water demand will be in the order of	No-Impact	APSEZ is meeting the current water demand through Narmada water supply scheme and	As per the master plan and permissions granted under EC, APSEZ will be developing progressively	APSEZ	As and When Required	Currently there are two fresh water sources available with APSEZ. **Desalination Plant** – 47 MLD **Narmada water through GWIL** – 9 MLD (sanctioned capacity). Current water demand for APSEZ along with SEZ industries including Adani Power Plant is an avg. of 32 MLD.

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	4,30,000 m3/day (430 MLD). APSEZ will be sourcing majority of the water from the captive desalination plants, which will be developed in progressive manner.		47 MLD captive desalination plant at site. Necessary water allocation from concerned authorities was obtained and the same will be renewed from time to time as per the directions of state government.	4,50,000 m3/day (450 MLD) of desalination plants to meet the future demand. Hence stress on regional water resources due to these developmental projects will be less significant.			So presently, these sources are adequate to fulfill the current freshwater requirement of entire APSEZ including member units. The desalination plant of additional capacities will be installed on modular basis considering future requirement of APSEZ.
3.2	Existing water demand in the Mundra taluk is estimated as 8500 m3/day (@55 lpcd) and the potable	Level-2	Adani Foundation has been contributing to various watershed development projects in the Mundra region to	Adani Foundation is planning to implement the various water resource conservation programs in next ten years under various	APSEZ and CGWB*	Long Term	Water needs of APSEZ is being met through existing Desalination Plant of APSEZ and GWIL which may be further enhanced on modular basis, At present Ground water is not utilized for any activities within APSEZ. However various works are being carried out by Adani Foundation continuously under Water Conservation Work to achieve water security in Mundra region by Adani Foundation. Following works are carried out as a part of water conservation work since April – 2018.

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	and sanitation water needs would increase to 37,000 m3/day (@125 lpcd) in future when the area is fully grown into larger municipality due to induced economic growth. Water demand of the local communities is met through Narmada water supply system to some extent, but largely depending		enhance ground water resources in the area. Adani Foundation has contributed about Rs. 300 Lakhs so far for the development of 18 check dams.	schemes.			Water conservation Projects i.e. Roof Top Rain Water Harvesting, Desilting of Check dams, Bore Well Recharge and Pond deepening were taken up in past years, review and monitoring of all water harvesting structures had been taken up. To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, this year Adani Foundation launch project "Sanrakshan" in coordination with GUIDE and Sahjeevan. Since, 10 years considerable Water Conservation Work carried out in Mundra Taluka. Due to satisfactory rain in current year 1.11 mtr ground water table increased as per increased in coastal belt of Mundra as per Government Figures. **Our water conservation work is as below.** • Augmentation of 2 check dams in addition of existing 18 check dams (1 Check dam current year). • Ground recharge activities (pond deepening work for more than 52 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers. • Roof Top Rain Water Harvesting 90 Nos. (35 Nos current year) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. • Recharge Borewell 125 Nos (50 Nos current year).

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
	on the ground water in the study area. Mundra block is reported to be a safe ground block as on date. Due to influx of people and rapid urbanization due to the economic development, there could be some stress on the ground water resources in future.						• Drip Irrigation 980 Farmers (56 Application current year) benefitted in coordination with Gujrat Green Revolution Company. • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. • Luni Pond Bund Repairing Work is completed. With the objective of to preserve the rainwater to reduce the impact of salinity and recharge the ground water (the main source of water) to facilitate the Agricultural activities as well as for drinking water. Adani foundation has spent approx. INR 4977.63 lakhs from April – 2018 to Sep – 2021 for CSR activities which also includes water conservation projects as mentioned above.
3.3	It is estimated that about 60,000 m3/day (60	No Impact	Seven sewage treatment plants with an aggregate	APSEZ is permitted to develop decentralized sewage	APSEZ	As and When Required	Current installed capacity of wastewater treatment plants is 6.05 MLD (ETP, STPs & CETP) for treatment of effluent & sewage generated at various locations of APSEZ excluding wastewater treatment plants installed within induvial member units.

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	MLD) of sewage will be generated from the APSEZ facility when the project is fully developed.		capacity of 3.1 MLD have already built at APSEZ. Treated sewage is utilized for greenbelt development and sewage is not discharged into either seasonal natural streams or marine environment.	treatment plants of total 62 MLD capacities. Existing sewage treatment facilities will be augmented progressively based on the development at APSEZ in future. Similar to existing practices, treated sewage will be utilized for greenbelt development.			Out of 45, only 4 operational industries within the SEZ are sending their partially treated industrial as well as domestic effluent to the CETP confirming to CETP inlet norms for further treatment and final disposal. Other SEZ industries have their own STPs / ETPs for treatment of wastewater generated from their industrial operation and discharging the treated water on land for horticulture purpose within their premises as per specific permission granted by SPCB. APSEZ also granted permission to treat 2.5 MLD of sewage generated from Mundra village through CETP and STP. Presently avg. 2.39 MLD of wastewater (in to ETP, STPs & CETP) is treated and being utilized on land for horticulture purpose within APSEZ premises during April'21 to September'21. Existing wastewater treatment plants are adequate to treat and handle the total effluent / sewage load considering current development. Existing wastewater treatment facilities will be augmented, or new plants will be developed on modular basis considering future requirement.
4	**Air quality management Plan**						
4.1	Although all the regulated activities in the study area will be adopting	Level-2	APSEZ and other thermal power plants have obtained valid consent to operate	All existing and new industrial establishments will obtain requisite consents from GPCB and	APSEZ And Other Industries	Continual Process	APSEZ has been granted requisite permissions from the concerned authorities with stipulated norms for air emission (flue gas as well as ambient air). Ambient Air Quality monitoring is being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Pollucon Laboratory Pvt. Ltd. and M/s. UniStar Environment

<table>
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<tr><td></td><td>promulgated emission norms, total air emission mass discharge from the study area would increase.</td><td></td><td>and have been operating the facilities as per the emission norms stipulated in respective consent orders. APSEZ and other two power plants are monitoring the ambient air quality on regular intervals as per GPCB/CPCB guidelines and the data is analyzed and presented to GPCB on monthly basis. Both</td><td>adhere to the stipulated emission norms regulations and guidelines issued by authorities from time to time.</td><td></td><td></td><td>& Research Labs Pvt. Ltd. for APL as per NAAQ standards, 2009. Stack emission monitoring is also being carried out on regular basis. Reports of the same are being submitted to the concerned authorities on regular basis.

Adani power plant has installed continuous emission and air quality monitoring instruments as per CPCB Directive and submitting the reports also. Another power plant of CGPL is outside APSEZ area.

The AAQM summary for last six months (Apr'21 to Sep'21) are as below.

Locations: 17 Nos. (APSEZ – 12 + APL – 5 including 3 villages)
Frequency: Twice in a week
<table>
<tr><th>Parameter</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit$</th></tr>
<tr><td>PM_{10}</td><td>µg/m³</td><td>95.62</td><td>40.22</td><td>100</td></tr>
<tr><td>$PM_{2.5}$</td><td>µg/m³</td><td>57.32</td><td>15.58</td><td>60</td></tr>
<tr><td>SO_2</td><td>µg/m³</td><td>30.55</td><td>6.22</td><td>80</td></tr>
<tr><td>NO_2</td><td>µg/m³</td><td>42.68</td><td>13.50</td><td>80</td></tr>
</table>
$ as per NAAQ standards, 2009
Values recorded confirms to the stipulated standards.

Approx. INR 9.56 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2021-22 (Till Sep'21), which also includes ambient air quality monitoring for overall APSEZ, Mundra.</td></tr>
</table>

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			the thermal power plants located within the study area have installed continuous emission and air quality monitoring instruments as per CPCB directive.				Other industries located within the SEZ have obtained requisite permissions from the competent authorities for their respective plant and they also carried out environmental monitoring within their premises to comply with the permission granted. The same has been ensured by APSEZ as well as SPCB during their regular visits. APSEZ carries out regular visits/inspections of member industries within SEZ and last visit was conducted during Feb & Mar' 2021 for EMS & compliance verification. During compliance verification, it was verified that monitoring of air emission was well within the permissible standards based on analysis reports. Same will be continued in future also. The monitoring reports of industries within SEZ are also being submitted to the regulatory authorities as a part of half yearly Compliance report of EC for Multi-Product SEZ.
				A common air quality management committee may be framed under the guidance of the State Pollution Control Board and district administration to manage regional level	APSEZ and Other Industries, Stakeholders, District Administration and GPCB*	Long Term And Continual	APSEZ will co-operate and comply with the directions from concerned regulatory authorities for air quality management within APSEZ area. However, at present, APSEZ has formed Internal Environment Monitoring Committee, involving officials from APSEZ, Adani Power Limited and other SEZ member units with following role and responsibilities: • Identification of sources of air & noise emission and its dispersion in surrounding villages • Remedial measures to eliminate, control, reduce or capture air & noise emission • Identify available resource to abate the air and noise emission

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				emission inventory data that can help to manage regional level air quality management goals.			• Required additional resources for control of air and noise emission • Drinking water and its testing of all the available fresh water sources in surrounding villages • Identify any surrounding villages affected by organization's improper waste disposal mechanism. Last committee meeting was conducted on dated 11th Sept 2021, and below was the point of discussion for way forward. • Brief introduction about the Environment Management Plan (EMP) • All members conveyed his environment management practices, issue & suggestions • Discussed about the various ways to improve existing practice to control the emission in terms of Air, Water and Noise. • Discussed about the proper management of the canteen waste. • Discussed about the cleaning of outside of the SEZ units. • Discussed about the management of rain water & cleaning of the storm water drains. APSEZ and all the industries within SEZ are in compliance to NAAQS and same is being ensured by APSEZ. The monitoring reports of industries within SEZ are being submitted to the regulatory authorities as part of half yearly Compliance report of EC for Multi-Product SEZ.
	Release of		APSEZ has				Following safeguard measures are taken by APSEZ for

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4.2	particulate emissions from handling and storage of coal at the port and power plants would influence PM10 and PM2.5 concentration in the background air. This could pose some health impacts such as asthma and COPD etc. among the local communities.	Health Impact	been implementing the following management plan to control emissions as per the applicable regulations and similar practices will be adopted in future: Entire bulk material handling facilities are mechanized. Regular water sprinkling on road and other open areas, regular cleaning of roads, dry fog dust suppression systems	All industries located in the APSEZ shall adhere to the emissions norms and minimum stack height guidelines issued by CPCB and consent to operate issued by Gujarat Pollution Control Board from time to time.	APSEZ and Other Industries	Continual Process	abatement of dust emissions. • Adequate stack heights to the Boilers, D.G. Sets, TFHs & HWGs for proper dispersion of pollutants within APSEZ • Using of liquid & Gaseous fuels instead of solid fuels in Boilers, Thermic fluid heaters and hot water generators. • Regular sprinkling on road and other open area • Regular cleaning of roads • Dry fog Dust Suppression System (DSS) in hopper, transfer towers and conveyor belts • Use of water mist canon • Closed type conveyor belts • Regular sprinkling on coal heaps • Covering other types of dry bulk cargo heaps • Installation of wind breaking wall • Development of greenbelt along the periphery of the storage yards/back up area • Mechanized handling system for coal and other dry bulk cargo • Wagon loading and truck loading through closed silo Adequate air pollution control measures like ESPs, FGDs, Bag Filters, etc. and adequate stack heights provisions are implemented within the thermal power plant. The stack monitoring summary for last six months (Apr'21 to Sep'21) are as below. Total Nos. of Stacks: 22 Nos.

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td></td><td></td><td>(DSS) in hoppers, transfer towers and conveyor belts, use of water mist canon, covered conveyor belts, regular sprinkling on coal heaps,</td><td></td><td></td><td></td><td>Frequency: Monthly / Half Yearly
<table>
<tr><th>Parameter</th><th>Unit</th><th>GPCB Limit</th><th>Min</th><th>Max</th></tr>
<tr><td>PM</td><td>mg/Nm^3</td><td>150</td><td>15.30</td><td>35.42</td></tr>
<tr><td>SO_2</td><td>Ppm</td><td>100</td><td>3.73</td><td>7.71</td></tr>
<tr><td>NO_x</td><td>ppm</td><td>50</td><td>24.27</td><td>38.50</td></tr>
</table>
Values recorded confirms to the stipulated standards.

Approx. INR 9.56 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2021-22 (Till Sep'21), which also includes stack monitoring for overall APSEZ, Mundra.

All other industries located within SEZ are adhere to provide adequate stack height and pollution control measures for proper dispersion of pollutants as per respective permissions granted by the board. The same is being inspected and ensured by APSEZ as well as SPCB officials on regular basis.</td></tr>
<tr><td></td><td></td><td></td><td>covering of other types of dry bulk cargo heaps by protective materials, installation of wind breaking wall, development of greenbelt along the</td><td>An internal Coal Dust Management Working Group shall be formed by APSEZ to effectively co-ordinate the approach to</td><td>APSEZ and Other Industries, Concerned Stake holders, District Administration*</td><td>Long Term</td><td>As mentioned above, presently, APSEZ has formed Internal Environment Monitoring Committee, involving Officials of APSEZ, Adani Power Limited & other member units, with specific role and responsibilities as defined above.

The dry cargo is being handled by mechanized system and transported by covered conveyer system, trucks and rail wagons.
Wind breaking wall is provided around the coal storage yards of APSEZ as well as Adani Power Plant.

Adequate air pollution control measures like ESPs, FGDs,</td></tr>
</table>

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			periphery of the storage yards/back up area and mechanized handling system for coal and other dry bulk cargo and Wagon loading and truck loading through closed silo. Both thermal power plants in the study area have installed electrostatic precipitators on the boilers and are meeting the emission norms as per the respective ECs granted.	coal dust management and monitoring			Bag Filters, etc. and adequate stack heights provisions within the thermal power plant for proper dispersion of pollutants. Green belt / plantation is provided around the periphery of dry cargo storage area and regular water sprinkling is also being done to abate the dust emission from coal hips. Last committee meeting was conducted on dated 11th Sept 2021, and below were the point of discussion for way forward. • Brief introduction about the Environment Management Plan (EMP) • All members conveyed his environment management practices, issue & suggestions • Discussed about the various ways to improve existing practice to control the emission in terms of Air, Water and Noise. • Discussed about the proper management of the canteen waste. • Discussed about the cleaning of outside of the SEZ units. • Discussed about the management of rain water & cleaning of the storm water drains.

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			Due to installation of tall stacks as per CPCB guidelines and EC conditions, the relative air pollution impacts due to release of emissions from two power plants is insignificant.				
4.3	Ships are one of the significant sources of SO2 and NOX emissions in the study area. Marine diesel engines on the ships often utilize fuel oils that	Level-2	A Standard Operating Procedure (SOP) has be developed to be included as a part of APSEZ environment management	The current global limit for Sulphur content of ships fuel oil is 3.5 % m/m (mass by mass). According to MARPOL, the new global cap on sulphur in the marine	APSEZ and Ship Owners	Long Term	The ships coming to the APSEZ is complying with MARPOL and other shipping rules and regulations. APSEZ has already started providing shore power supply to the tugs (11 Nos.), dredgers (2 Nos.) and barges (1 No.). The feasibility of shore power will be explored and implemented on large scale for the visiting vessels to reduce idling stage ship emissions.

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	might contain higher sulphur content. As per the international best practices, these marine diesel engines are designed to meet MARPOL regulations with NOX emissions less than 14.4 gram/Kwhr of engine. Due to lower stack heights of the marine diesel engine, ship emissions often gets		plan to verify that all ships anchored at the port are adopting the MARPOL4 regulations.	vessel fuels will be 0.50% m/m by the 1st January 2025. APSEZ should explore the possibility of providing shore power to the ships at the port to reduce idling stage ship emissions.			

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	dispersed in the local environment and might pose risk of fumigation during the early morning and evening hours due to atmospheric inversion break-up periods.						
4.4	Road vehicle emissions will be other major contributors to the air pollution in the region when the facility is fully	Level-2	Not Applicable	Due to implementation of Bharat VI fuels (MoEF&CC)6 in near future the vehicular and diesel engine emissions will be reduced by about 50% from the current national levels. APSEZ should	APSEZ and All Industries	Short Term	Presently, cargo evacuation through rail / conveyer / pipeline has increased to ~40 %, thereby reducing the usage of road. Vehicles having valid PUC certificate are only being allowed to enter within APSEZ area. In future, APSEZ will also explore the feasibility of using Electric Vehicles for internal cargo movement.

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	developed.			develop a robust contractor environmental policy to ensure that Bharat Stage VI emission norms are adopted by all their contractors and sub-contractors.			
5	**Noise emissions**						
5.1	Noise emissions are envisaged from port operations, industrial operations and power plants in the study area. Any increase	Level-1	Due to adoption of various mechanized operations at the waterfront development, the noise emissions from the port cargo handling will be minimal.	APSEZ, all the tenant industries and facilities within APSEZ are required to undertake noise monitoring at their facilities to demonstrate the compliance	APSEZ	Continual Process	Below Safeguard measures are already taken for abatement of noise emissions. • Development of greenbelt along the periphery of the operational area. • D.G. Sets having Acoustic enclosures. • Maintenance of plant machineries and equipment's on regular frequency. Noise monitoring is being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Pollucon Laboratory Pvt. Ltd. as per permission granted and reports are being submitted to the concerned authorities on regular basis.

<table>
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<tr><td></td><td>in noise levels beyond three decibels from the background levels would be perceived as noise nuisance (USEPA)7.</td><td></td><td>An adequate greenbelt is being developed by APSEZ to further reduce any residual impacts due to noise emissions from the facility. Periodic noise level monitoring programs were adopted by APSEZ. Predicted noise levels were found to be well within the designated noise standards for Industrial facilities.</td><td>with the Noise level standards. Continuous noise recording units can be installed by APSEZ at facility boundary to address the community grievances, when ever required. To assess the overall site wide compliance and also to address any community grievances related to noise issues due to operation of APSEZ facilities.</td><td></td><td></td><td>The noise monitoring summary for last six months (Apr'21 to Sep'21) are as below.

Locations: 12 Nos.
Frequency: Once in a month (24 hourly)
<table><tr><th>Noise</th><th>Unit</th><th>Leq Max</th><th>Leq Min</th><th>Leq Perm. Limit$</th></tr><tr><td>Day Time</td><td>dB(A)</td><td>73.5</td><td>69.8</td><td>75</td></tr><tr><td>Night Time</td><td>dB(A)</td><td>48.4</td><td>43.5</td><td>70</td></tr></table>$ as per GPCB standards

Approx. INR 9.56 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2021-22 (Till Sep'21), which also includes noise monitoring for overall APSEZ, Mundra.

All the results are well within the standards. From this it can be inferred that there no impacts on the surrounding community.

All other industries located in the APSEZ are adhere to monitor and control the ambient noise level as per permission granted by SPCB and same is being confirmed by APSEZ as well as SPCB on regular basis.

Further, till date APSEZ has not received any grievances/notice for noise issues from any of the stakeholders.</td></tr>
</table>

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				In order to address the public grievances related to noise from the facility, an internal Noise Management Committee can be formed by APSEZ to investigate the root cause and to develop and implement noise mitigation plans in the specific zones.	APSEZ	Continual Process	As mentioned above, presently, APSEZ has formed Internal Environment Monitoring Committee, involving Officials of APSEZ, Adani Power Limited & other member units, having role and responsibilities as defined above. Last committee meeting was conducted on dated 11th Sept 2021, and below were the point of discussion for way forward. • Brief introduction about the Environment Management Plan (EMP) • All members conveyed his environment management practices, issue & suggestions • Discussed about the various ways to improve existing practice to control the emission in terms of Air, Water and Noise. • Discussed about the proper management of the canteen waste. • Discussed about the cleaning of outside of the SEZ units. • Discussed about the management of rain water & cleaning of the storm water drains. No grievance received for noise related issues, and it is observed that ambient noise level are well within the permissible standards.
6	**Surface water quality (Terrestrial and Marine)**						
6.1	In general, release of untreated	Level -1	As per the master plan of APSEZ, 67 MLD of	As per the master plan of APSEZ, the existing CETP	APSEZ	As and When Required	APSEZ has installed Common Effluent Treatment Plant (CETP) having 2.5 MLD capacities for treatment of partially treated effluent and sewage generated from industries within SEZ.

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	wastewater from industrial facilities would pose threat to water quality of streams, estuaries and marine water bodies.		wastewater is expected to be generated from the fully developed project scenario, for which necessary permissions to set up decentralized CETPs of various capacities are already obtained. Presently a CETP capacity of 2.5 MLD is in place. Presently member units treat their effluents to meet the CETP inlet norms and	shall be augmented to 67 MLD in progressive manner based on the future demand. The facility should limit the marine discharge of treated industrial wastewater to 16 MLD as per the permits. Remaining treated wastewater shall be utilized for horticulture purpose.			Currently, CETP receives 685 KLD (Avg.) hydraulic load and considering the current development scenario, existing CETP is adequate to treat and handle the total effluent load coming from industries within SEZ. Out of 45 only 4 industries within SEZ are sending their partially treated industrial as well as domestic effluent to the CETP confirming CETP inlet norms for further treatment and final disposal. Other industries within SEZ have their own STPs / ETPs for treatment of wastewater generated from their industrial operation and discharging the treated water on land for horticulture purpose within their premises as per permission granted by SPCB. The capacities of CETP will be enhanced on modular basis as per future requirement. Presently avg. 2.39 MLD (from CETP, ETP & STPs) of treated water is being utilized on land for horticulture purpose within APSEZ premises during period April 21 to Sept'21 and no discharge is made to any other source.

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			then send it to CETP. Treated wastewater from CETP meets the stipulated discharge norms for utilization for greenbelt development within the APSEZ areas.				
			Online wastewater quality monitoring systems are installed at CETP to ensure quality of treated effluent meets the requisite discharge norms. No wastewater	Efforts shall be made to recycle complete treated wastewater for port operations and industrial operations of APSEZ in future based on a detailed techno-economic feasibility	APSEZ	Based on outcome Techno-feasibility Study	Online continuous effluent monitoring system installed at the discharge point of CETP to track any deviation from discharge norms. Presently entire quantity of treated water from CETP is used for gardening / horticulture purpose within APSEZ premises.

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<tr><td></td><td></td><td></td><td>from CETP is discharged into natural bodies as on date..</td><td>study.</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>Runoff during monsoon from coal storage yards is collected in sedimentation ponds (dump pond) to remove any residual dust particulates for further disposal into sea</td><td>Storm water runoff from the facility during the first rain shall be sampled and analyzed for the presence of heavy metals or other criteria pollutants to adopt corrective and preventive actions to protect the marine water quality.
All red and hazard category industry within APSEZ shall adopt spill</td><td>APSEZ</td><td>Continual</td><td>There are provision of drains around coal stack yard to carry to runoff water to dump ponds. This water is either used for dust suppression or after sedimentation (to remove residual dust), is allowed disposal to sea.

Presently Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. for APSEZ and M/s. UniStar Environment & Research Labs Pvt. Ltd. for APL. The analysis reports of the same are being submitted to the concerned authorities on regular basis.

The marine water quality monitoring summary for last six months (Apr'21 to Sep'21) is as per below.

Locations: 14 Nos. (APSEZ – 9 + APL – 5)
Frequency: Once in a Month / Half Yearly

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Surface</th><th colspan="2">Bottom</th></tr>
<tr><th>Max</th><th>Min</th><th>Max</th><th>Min</th></tr>
<tr><td>pH</td><td>--</td><td>8.47</td><td>8.02</td><td>8.48</td><td>7.95</td></tr>
<tr><td>TSS</td><td>mg/L</td><td>135</td><td>46</td><td>156</td><td>46</td></tr>
<tr><td>BOD (3 Days @27 °C)</td><td>mg/L</td><td>5</td><td>2.26</td><td>3.9</td><td>ND*</td></tr>
</table>
</td></tr>
</table>

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				prevention and control program and no effluents shall be discharged into storm water-drains.			<table><tr><td>DO</td><td>mg/L</td><td>6.4</td><td>5.4</td><td>6</td><td>5</td></tr><tr><td>Salinity</td><td>ppt</td><td>37.4</td><td>34.3</td><td>37.7</td><td>33.8</td></tr></table> Approx. INR 9.56 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2021-22 (Till Sep'21), which also includes noise monitoring for overall APSEZ, Mundra.
			Detailed marine hydrodynamic modelling studies revealed that the current and proposed dredged soil disposal practices, sea water intake and outfall facilities and desalination plant outfall etc have shown insignificant impact on the marine eco-system. As	Good dredging practices shall be adopted by APSEZ: (i).Improving the dredging accuracy (ii).Improving onboard automation and monitoring, (iii). Reduce spill and loss, (iv). evaluating the need for installing silt screens near mangrove areas during the dredging phase operations, (v).	APSEZ	Long Term	No capital dredging has been done, since Apr 2015. Dredged material generated during maintenance dredging is being disposed at designated locations within deep sea as identified by NIO. Dredging Management plan is adopted for carrying out dredging and management of dredge material. Presently there are 3 nos. (2 Nos. Cutter suction + 1 No. Trailer suction) of dredgers are in operation for dredging. Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. The analysis reports of the same are being submitted to the concerned authorities on regular basis. Summary of marine water for the last six months is as mentioned above. The same practice will be continued in future also as per direction by MoEF&CC as well as GPCB. Monitoring will be focused near ecological sensitive area in case of need to carryout capital dragging near such areas.

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			part of the comprehensive environmental monitoring program, APSEZ has been adopting marine water and sediment quality monitoring on monthly basis.	Environment friendly dredging activities can be undertaken in such a way that the overall turbidity levels near the mangrove and ecologically sensitive zones shall not exceed 100 NTU or 200 mg/l of TSS (10% lethal level of fish) Existing marine monitoring program shall be continued as per the directions of MoEF&CC and GPCB.			
7	**Groundwater quality and salinity ingress**						
	While Mundra		APSEZ is not utilizing	A dedicated desalination		As and When	Present source of water for various project activities is desalination plant of APSEZ and/or Narmada water through

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7.1	block is enjoying safe ground water status as on date (based on the data published by CGWB), due to induced economic and population growth, use of ground water resources by the local people might increase in Mundra region. This might increase the TDS and chloride levels in the ground water in	Level-2	ground water for any type of use. APSEZ is meeting the current water demand through Narmada water supply scheme and 47 MLD captive desalination plant at site.	plant of capacity 4,50,000 m3/day (450 MLD) will be developed in progressive manner to meet the APSEZ requirements.	APSEZ	Required	Gujarat Water Infrastructure Limited and same is sufficient to meet the present water demand. APSEZ does not draw any ground water. The desalination plant of additional capacities will be installed on modular basis considering future development and requirement.

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	future.						
7.2	Due to induced growth in the region, pressure on the available ground water source would increase and this could pose some threat to salinity ingress.	Level-2	Ground water is not drawn by APSEZ for its operations. Natural streams (seasonal rivers) passing through the APSEZ area will not be disturbed, the micro-watershed in the area will not be disturbed. Due to the above reasons, the possibility of salinity ingress due to APSEZ development is not envisaged.	The Govt. of Gujarat, Narmada, Water Resources, Water Supply & Kalpsar Dept.,(WRD)12 has been implementing various salinity ingress prevention projects	District Administration*	Long Term	APSEZ will co-operate and comply with the directions from concerned regulatory authorities. APSEZ does not draw any ground water for the fresh water requirement. However, Adani Foundation – CSR arm of Adani Group has carried out rainwater harvesting activities in the nearby villages for benefit of the locals. Water conservation Projects i.e. Roof Top Rain Water Harvesting, Desilting of Check dams, Bore Well Recharge and Pond deepening were taken up in past years, review and monitoring of all water harvesting structures had been taken up. To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, this year Adani Foundation launch project “Sanrakshan” in coordination with GUIDE and Sahjeevan. Since, 10 years considerable Water Conservation Work carried out in Mundra Taluka. Due to satisfactory rain in current year 1.11 mtr ground water table increased as per increased in coastal belt of Mundra as per Government Figures. **Our water conservation work is as below.** • Augmentation of 2 check dams (1 Check dam current year).

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			Mundra and Anjar blocks fall under fresh water to medium salinity zones. It can be observed that little variation was observed in the ground water salinity levels from year 2013 to 2016 across the Mundra and Anjar blocks. This aspect confirms that the overall salinity ingress from the shore into the land due to existing				• Ground recharge activities (pond deepening work for more than 52 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers. • Roof Top Rain Water Harvesting 90 Nos. (35 Nos current year) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. • Recharge Borewell 125 Nos (50 Nos current year) which is best ever option to. • Drip Irrigation 980 Farmers (56 Application current year) benefitted in coordination with Gujrat Green Revolution Company. • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. • Luni Pond Bund Repairing Work is completed. With the objective of to preserve the rainwater to reduce the impact of salinity and recharge the ground water (the main source of water) to facilitate the Agricultural activities as well as for drinking water. Narmada Water Resources, Water Supply & Kalpsar Dept.,(WRD)1 has been implementing various salinity ingress prevention projects. Under Sardar Sarovar canal project, Govt. of Gujarat has proposed to implement about 8200 Km

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<tr><td></td><td></td><td></td><td>APSEZ facilities and power plant outfalls are less significant.</td><td></td><td></td><td></td><td>stretch of water canal and the project is at various stages of implementation. Under this project about 112,000 ha of land in about 180 villages will be benefitted with irrigation needs. This will significantly reduce the pressure on the ground water resources in the region.</td></tr>
<tr><td></td><td></td><td></td><td></td><td>While the individual industries in the study area will continue to undertake ground water quality monitoring as per the environmental clearances issued for the respective projects, a regional level ground water conservation action committee can be formed under the guidance of state ground</td><td>All Concerned Stakeholders, District Administration and CGWB*</td><td>Continual Process</td><td>APSEZ (7 Locations – half yearly) & Adani Power Ltd. (5 Locations – quarterly) is carrying out ground water sampling and reports of the same are being submitted to the regulatory authorities on regular basis.

The summary of APSEZ ground water quality monitoring for last six months (Apr'21 to Sep'21) are as below.
<table>
<tr><th>Nos. of Location: 07Sr. No.</th><th>Parameter</th><th>Unit</th><th>Min</th><th>Max</th></tr>
<tr><td>1</td><td>pH</td><td>--</td><td>7.73</td><td>8.35</td></tr>
<tr><td>2</td><td>Salinity</td><td>ppt</td><td>0.91</td><td>7.44</td></tr>
<tr><td>3</td><td>Oil & Grease</td><td>mg/L</td><td>ND*</td><td>ND*</td></tr>
<tr><td>4</td><td>Hydrocarbon</td><td>mg/L</td><td>ND*</td><td>ND*</td></tr>
<tr><td>5</td><td>Lead as Pb</td><td>mg/L</td><td>0.02</td><td>0.22</td></tr>
<tr><td>6</td><td>Arsenic as As</td><td>mg/L</td><td>ND*</td><td>ND*</td></tr>
<tr><td>7</td><td>Nickel as Ni</td><td>mg/L</td><td>ND*</td><td>ND*</td></tr>
</table></td></tr>
</table>

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				water board and district Administration.			

8	Total Chromium as Cr	mg/L	0.02	0.04
9	Cadmium as Cd	mg/L	ND*	ND*
10	Mercury as Hg	mg/L	ND*	ND*
11	Zinc as Zn	mg/L	0.14	0.64
12	Copper as Cu	mg/L	ND*	ND*
13	Iron as Fe	mg/L	0.27	3.86
14	Insecticides/Pesticides	mg/L	ND*	ND*
15	Depth of Water Level from Ground Level	meter	1.90	2.18

* ND – Not Detectable

Approx. INR 9.56 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2021-22 (Till Sep'21), which also includes noise monitoring for overall APSEZ, Mundra.

The freshwater requirement of all the industries within SEZ is being satisfied through APSEZ. All the industries are encouraged to monitor ground water quality as per the permissions granted by competent authorities.

As mentioned above, presently, APSEZ has formed Internal Environment Monitoring Committee, involving Officials of

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							APSEZ, Adani Power Limited and other member units, having role and responsibilities as defined above. APSEZ will co-operate and comply with the directions from concerned regulatory authorities for ground water management.
8	**Waste Management**						
8.1	Solid waste will be generated from industrial activities of APSEZ and other permitted facilities in the study area including Mundra town. These wastes would contain recyclable material, construction debris, organic	Level-2	APSEZ has been adopting Zero waste Initiatives and the entire waste generated from existing operations is segregated and disposed to recycling vendors, thereby APSEZ has achieved zero landfill status as on date.	APSEZ will continue to adopt Zero Waste Initiative and wastes will be segregated at source and disposed to various recycling vendors, co-processing in cement plants. This initiative helps not only to reduce the waste to landfill significantly, but also to recycle the materials there	APSEZ	Continual Process	Presently APSEZ has implemented Zero waste Initiatives as per 5R (Reduce, Reuse, Recycle, Recover & Reprocess) principles of waste management. At present, APSEZ has developed material recovery facility for 6.0 TPD capacities. A well-established system for segregation of dry & wet waste is in place. All wet waste (Organic waste) is being segregated & utilized for compost manufacturing and/or biogas generation for cooking purpose. The compost is further used by in house horticulture team for greenbelt development. Whereas dry recyclable waste is being sorted in various categories. Presently manual sorting is being done for sorting of different types of solid waste. Segregated recyclable materials such as Paper, Plastic, Cardboard, PET Bottles, Glass etc. are then sent to respective recycling units, whereas remaining non-recyclable waste is bailed and sent to cement plants for Co-processing as RDF (Refused Derived Fuel). The same practice will be continued in future also. APSEZ has also been recognized for Zero Waste to Landfill certification from reputed organization. APSEZ, Mundra is certified for Zero Waste to Landfill management system (ZWTL MS 2020) by TUVRheinland

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	waste, inert material and e-waste etc. In the absence of any organized source segregation programs and material recycling strategies and infrastructure facilities, these wastes will enter into environment and would pose long term health impacts.			by avoiding ecological impacts.			India Pvt. Ltd. (valid up to 31.05.2024). APSEZ, Mundra has also been certified as Single Use Plastic (SUP) Free Port by Confederation of Indian Industry (CII) (valid up to 25.05.2022). Details of the same are attached as **Annexure – 8**. APSEZ will continue proper solid waste management in his operational area.
8.2	Considering an average solid waste generation	Level-2	APSEZ has made a provision for central waste management facilities	The existing waste segregation and material recycling facilities will	APSEZ	Continual Process	

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	of 0.25 Kg/person/day, the estimated solid waste from facilities within APSEZ will be in the order of 100 TPD (36,500 TPA).		within the existing site based on the future needs. As part of the Zero Waste Initiatives, no landfill facilities will be installed at APSEZ.	be augmented to dispose safely the wastes generated from APSEZ areas. Solid Waste Management Program shall be adopted and implemented as per Municipal Solid Waste Management Rules 2016 and Construction Waste Management Rules 2016			
8.3	About 35 TPD (13,000 TPA) of solid waste would be generated from the	Level-2	As per the MSW Rules 2016 all the industrial facilities and SEZs are required to	Solid Waste Management Program shall be adopted and implemented as per Municipal	All Industries	Continual Process	Industries located within the SEZ area are also complying with the waste management rules stipulated by statutory authorities and same is also being confirmed by APSEZ as well SPCB on regular basis.

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	proposed industrial areas located outside the APSEZ area.		adopt waste segregation facilities at the respective properties and non-recyclable waste shall be disposed to landfill sites.	Solid Waste Management Rules 2016 and Construction Waste Management Rules 2016			
9	**Ecological aspects (terrestrial and marine)**						
9.1	About 1576 ha of shrub forest land contiguous to APSEZ area is applied for land diversion for various developmen	Level -1	It is noted that the designated forest land is free from any native vegetation and comprises of Prosopis juliflora. It is also noted that no	APSEZ has approached concerned authorities for diversion of designated forest land. Suitable compensatory afforestation plan shall be adopted based on the recommendations and	APSEZ/State Forest Department*	Long Term	Stage – 1 forest Clearance for about 1576.81 Ha Forest land has been obtained. Presently APSEZ is in the process of compliance to the stage – 1 Forest Clearance conditions, for further submitting to Govt. authorities for issuance of Stage-2 Forest Clearance.

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	tal activities. This might have certain level of changes in the biodiversity in the study area.		endangered species are present at the shrub forests that are applied for land diversion. It is also noted that no forest produce is reported from this designated forest land parcel due to lack of economic importance of plant species reported in the shrub forest. It is also noted that no tribal lands are located in the	directions of the concerned authorities. Due to adoption of compensatory afforestation program through a scientific manner, the overall ecological footprint in the district will be increased. Due to plantation of native tree species as part of greenbelt development, the overall biodiversity of the region will increase considerably when the project is fully developed.			

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			designated forest land parcel. Hence there will not be any change in biodiversity due to the proposed diversion.				
9.2	Mangrove conservation areas are located adjacent to the APSEZ area. Accidental discharges of industrial effluents into the marine environment would pose certain ecological risk.	Level -1	No development activities will be undertaken within mangrove conservation areas. APSEZ has taken up large scale mangrove afforestation activities in an area of more than 2800 ha at various locations	Mangrove footprint and health status shall be monitored annually	APSEZ	Continual Process	As per study conducted by NCSCM in 2017, mangrove cover in and around APSEZ, Mundra has increased from 2094 Ha to 2340 ha (as compared between 2011 to 2017). The analysis has shown an overall growth of 246 ha. The cost for said study was INR 3.15 Cr. Recently study was carried out in the year 2019 and based on that there is an increase of mangrove cover between **March 2017 (Total 2340) and September 2019** with an extent of **256 Ha (Total 2596 Ha Area)** which is about **10.94%** rise in growth rate, also It reveals that the mangrove and the tidal system in the creeks remained undisturbed over this period. Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is **502 Ha** between 2011 and 2019. Analysis of data between categories indicated that there was an **increase in dense mangroves** along with the

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<tr><td></td><td></td><td></td><td>across the coast of Gujarat state in consultation with various organizations The Adani Foundation introduced 'Mangrove Nursery Development and Plantation' scheme in the area as an alternative income generating activity for the people of the region.</td><td></td><td></td><td></td><td>conversion of scattered into sparse, that shows the growth of mangroves in a progressive direction.

As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.
<table>
<tr><th>Sr. No.</th><th>Recommendations</th><th>Compliance</th></tr>
<tr><td>1.</td><td>Mangrove mapping and monitoring in and around APSEZ</td><td>• APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island.
• As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 & 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.7%.
• This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion</td></tr>
</table></td></tr>
</table>

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									of scattered to sparse which also shows that the growth of mangroves in a progressive direction. • Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019. • The cost of the said study was INR 23.56 Lacs incurred by APSEZ.
							2.	Tidal observation in creeks in and around APSEZ	• APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM. • The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves. • The cost of the said activity was INR 1.0 Lacs.
							3.	Removal of Algal and Prosopis growth from mangrove areas	• Algal and Prosopis growth monitoring was done in and around mangrove area and algal encrustation was found in some of the mangrove areas, which has been removed manually. • The cost of the said activity was INR 1.2 Lacs.

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							4.	Awareness of mangroves importance in surrounding communities	• Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the community regarding importance of mangroves. • Adani Foundation has also provided 8.95 lacs kg Dry Fodder and 24.25 lacs kg Green fodder in 21 villages of Mundra and Anjar Block to support the resource dependent villagers, to avoid their dependency on mangroves. The expenditure for fodder supporting activities was approx. 122.7 Lacs during FY 2021-22 (Till Sep'21). • Village Gauchar land development for the fodder cultivation to made fodder sustain village & Avail green fodder in scarcity phase. With the support of Gauchar Seva Samiti Grassland development in Siracha – 85 Acre & Zarpara – 25 Acre done which resulted in total production of 82 ton. • Other than this dedicated security guard with gate system deployed by APSEZ across the coastal area and no any unauthorized persons allowed within coastal as well as mangrove areas. • Refer CSR report attached as **Annexure – 1**.

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							Other than this Adani Foundation – CSR Arm of Adani Group at Mundra-Kutch has initiated multi-species plantation of mangroves in Luni village in association with GUIDE, Gujarat. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. Current year 3 ha development is planned to extend multi-species mangrove plantation. Mangrove plantation done at Luni sea coast with fisher folk community during World Environment Day Celebration. Web talk show was organized on the occasion of "World Mangrove days On Multi species Mangrove bio diversity with Joint effort of GUIDE and Adani Foundation, Mundra. 8th June is celebrated as world ocean day. Adani foundation had celebrated the world ocean day by coastal cleaning activity at Juna Bandar, Luni Bandar and Bavadi Bandar. Mangroves nursery is developed in a Khari creek behind IOCL & 50,000 Nos. of new saplings were planted in creek area by APSEZ.
9.3	Outfall from the thermal power plants desalination and CETP would pose	Level-1	A detailed marine hydro-dynamic and dispersion modelling of the study area indicates that the	All approved marine outfalls shall be monitored for salinity, temperature and other designated	APSEZ and Concerned Industry	Continual Process	Presently marine monitoring is being carried out by the Adani power plant at the marine outfall locations and reports are being submitted to the concerned authorities on regular basis. APSEZ is carrying out Marine monitoring once in a month at 9 locations in deep sea by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. The analysis reports of the same are being submitted to the

<table>
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<tr><td></td><td>certain level of impact on the marine environment.</td><td></td><td>background temperature and salinity at mangrove conservation area will not increase from the prevailing background levels as the outfalls are located far away. APSEZ and respective power plants in the study area have been monitoring the marine water quality status on monthly basis for the stipulated environmental and ecological parameters.</td><td>parameters as per consent to establish issued by GPCB. Existing marine environmental monitoring program shall be continued.</td><td></td><td></td><td>concerned authorities on regular basis.

Adani power plant is also doing marine water quality at 5 locations (2 locations at outfall location) in deep sea by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment & Research Labs Pvt. Ltd. The analysis reports of the same are being submitted to the concerned authorities on regular basis. The summary of marine water quality is shown above.

The comparison of marine water results between CIA and current monitoring data are as below.

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Max</th><th colspan="2">Min</th></tr>
<tr><th>CIA</th><th>Present</th><th>CIA</th><th>Present</th></tr>
<tr><td>Temp.</td><td>^{0}C</td><td>30.2</td><td>29</td><td>28</td><td>28</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>41.8</td><td>35.3</td><td>34.9</td><td>33.8</td></tr>
</table>

As per above results, it can be seen that there is no major deviation in the concentration of parameters and thus indicates that impacts are insignificant.</td></tr>
</table>

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9.4	**Terrestrial Ecology:** Study area doesn't have any notified national parks or ecological sanctuaries. Since the area falls under dry deciduous shrubs. Due to scanty rains in the area, the overall natural green-cover/vegetation in the area is very small.	Level-1	APSEZ has developed greenbelt in an area of 550ha as against the committed area of 430ha. A dedicatenursery is set up to promote plantation. APSEZ have undertaken a plantation with about 9.6 Lakh fully grown trees.	The compensatory afforestation area to be monitored annually to check the survival rate of the plantation.	APSEZ	Continual Process	APSEZ has developed its own "Dept. of Horticulture" which is taking measures/ steps for terrestrial plantation/greenbelt development. APSEZ, Individual SEZ Industries and Adani Power Plant has developed more than 700 Ha. area as greenbelt with plantation more than 10 Lacs saplings within the APSEZ area including SEZ industries & Adani Power Plant. Dedicated horticulture department is maintaining and monitoring the terrestrial green belt development on regular basis to check the survival rate of plantation. Total expenditures of the horticulture dept. of APSEZ during the FY 2021-22 (Till Sep'21) within APSEZ is INR 605 lakhs.
10	**Socio-economic aspects**						
10.1	Population growth in the Mundra region was reported to be in the order of	Level-1	Dedicated townships are developed within APSEZ area with necessary	The existing townships will be expanded to accommodate about 4lakh people when the	APSEZ	As and When Required	APSEZ has developed two townships (Shantivan and Samudra) accommodating 2180 households and associated infrastructure facilities. Accommodation is made available for all interested employees working within Adani group & SEZ industries. Out of which 88% Occupancies are

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	85%during the past decade (2001-2011). Further expansion of the urban area could be possible due to induced economic growth in the region. Increase in population will have a additional need for public infrastructure in the region.		community infrastructures such as hospital, school, recreational facilities, sewage treatment and waste collection facilities. Adani Foundation has been undertaking various CSR programs under the principal themes such as education, community health, sustainable livelihood and rural infrastructure. About Rs. 97 Cr has been spent on various CSR	project activity is fully developed.			accommodated within the townships and rest are available for employees working within APSEZ. At present 45 nos. of industries (processing & non-processing) are operating within the SEZ. Township facilities are also made by SEZ industries within Mundra town for their employees having basic infrastructure facilities and requirements. Most of the employees working in SEZ industries are residing in Mundra township having all basic requirements and associated facilities. The existing social infrastructure facilities are adequate to accommodate the people considering present APSEZ development. The existing townships with associated facilities will be expanded as per requirement. Other infrastructure facilities have been developed for people are as follows. • Multi-Specialty Hospital • School • Commercial complex • Religious place APSEZ is actively working with local community (including fishermen community) around the project area and provides required support for their livelihood and other concerns through the CSR arm – Adani Foundation in the main five persuasions is mentioned below. • Community Health • Sustainability Livelihood – Fisher Folk • Education • Rural Infrastructures

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			activities in the Mundra region since 2010. Similar community development programs (based on need based assessment) will be continued in future as well with allocation of appropriate budget.				Adani foundation has spent approx. INR 4977.63 lakhs from April – 2018 to Sep – 2021 for CSR activities which also includes cost of rural infrastructure projects. Major works carried out since April 2018 as a part of CSR activities are as below. • Pond Deepening work at Vadala & Mota Bhadiya • Artificial recharge borewell in Borana, Mangara & Dhrub village. • Under Dignity of Drivers Project, Adani Foundation has constructed Resting Shed for Drivers entering in SEZ Premises. Total 50 beds are constructed, drinking water and sanitation plus recreational – TV Facilities. • Construction of 45 Toilet block and proper bathing place for labours. • RO Plant – Samaghogha, Siracha village & Vallabh Vidyalaya at Mundra • Basic sanitation facility (18 Nos) at Balvadi, medical centre and retiring places at labour settlements • Ground recharge activities (pond deepening work for more than 52 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers. • Roof Top Rain Water Harvesting 54 Nos. and Recharge Bore well 75 Nos. • Drip Irrigation 980 Farmers benefitted in coordination with Gujrat Green Revolution Company • Participatory Ground Water Management in ten villages with holistic approach for Kankavati Sandstone Aquifer Programme. • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due

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							to which bore well depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. • Development of Prisha Park at Mundra. • Pond Bund strengthening at Zarpara Village • Approach Road Restoration at all Fisher folk vasahat. • Garden Development at Primary School Rampar village • Shed Development at Shukhpurvah Mundra • Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers to Uthhan Villages phase wise. Current year supported **117 home biogas** in Dhrub, Zarpara and Navinal Villages. • Adani Foundation at Mundra-Kachchh has initiated multi-species plantation of mangroves in Kachchh in association with GUIDE. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. • Sea Weed Culture - A pilot cultivation facility (5 KL tanks in 6 nos) for the farming of different economically important seaweeds in the tanks on the onshore has been established and commenced the cultivation trials with red sea weeds Kappaphycus alvarezii, Gracilaria dura and green sea weed Ulva. The initial trials have given very promising results and harvested 6-7 times the seeded material in a 40-45 days cultivation period. • 31 RRWHS structure have been completed • 45 Bore-well recharging activity is completed. • Development Approach road Prasala vadi vistar Gogan Pachim at Zarpara • Earthen bund Repairing work at Pond, Luni.

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							• Pre-monsoon activity Approach repairing, Village Pond Lake strengthen, and river cleaning (babul cutting) work is ongoing in Various Villages • Approach Road repairing at Various Fishermen Vasahat (ARC). Similar community development programs (based on need based assessment) will be continued in future as well with allocation of appropriate budget.
10.2	The overall sex ratio was found to reduce by 28% in the Mundra taluk (study area) during the period 2001-2011. This could be attributed to increase in influx of working men in the region due to rapid economic development. Similar trend might continue in future due to induced	Level-2	Adani foundation is taking up several girl child education programs as part of CSR activities to create awareness about girl child protection.	Suitable regional level awareness programs on the girl child protection and encouragement programs in line with state and national policies shall be adopted under Corporate Social Responsibility programs in association with district authorities.	APSEZ, Other development projects and District Administration*	Long Term	Major works carried out since April 2018 as a part of CSR activities to create awareness about girl child protection are as below. • The Adani Foundation provided scholarship support to motivation and encouragement of fishermen boys and girls for higher education under this program. APSEZ provide 100% fees support to girls as a scholarship. • Uthhan Project promotes girl child education, Creating awareness through various Govt schemes i.e. Vahali Dikri Yojana, Sukanya Samriddhi Yojana etc. till date covered more than 1200 girl child to get benefit out of it. • Separate sanitation facilities for girl child in schools. • Suposhan Project focus on adolescent and Reproductive age women nutrition part. Till date covered more than 12500 women and 8700 adolescents under this Project and brought them to considerable status. • .Beti Vadhavo Programme was organized in 32 Villages in the presence of Village Sarpanch and other leaders in year 2017-18. We explained people about the various topics i.e. importance of girl child, Sex Ratio, Gender

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
	economic growth in the region.						Equality and laws regarding Child abortion. This initiative was well accepted by community and we have observed a visible change in their mindset. We have facilitated 560 daughters with Kit (Small Bed sheet, Mosquito net, Soap and Cream with nutritious food for mother) To create awareness about health, personal hygiene, child education and nutritional diet in fishermen community, various awareness programs have been organized. • During the year various activity like, Covid-19 awareness in village & Slum Area, Menstrual Hygiene Day, Breastfeeding Week, National Deworming Day, National Nutrition Month had been celebrated. • Project Suposhan is initiated with the Motive ... Curb malnutrition amongst Children, Adolescent girls and Women in our CSR villages. ✓ 100 beneficiaries covered in Menstrual Hygiene Day - with slogan called "RED-ACHHA HAI" ✓ 204 beneficiaries covered in Breastfeeding Week ✓ 320 beneficiaries covered in National Deworming Day ✓ 20 villages covered in celebration of NATIONAL NUTRITION MONTH ✓ 42 FAMILY COUNSELLING • To reduce malnutrition and anemia amongst Children 95 % & adolescent girls and pregnant & lactating women by 70 %in three years • Reduction IMR and MMR • Support Awareness & Cover 100 %Vaccination taken by Child & women.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
							• SuPoshan Thanksgiving program was organized. In this webinar DDO, CDPO Mundra and other dignitiaries remained present and appreciated the efforts to overcome malnourishment in Mundra and Bitta. • The National girl child day was celebrated with ICDC Department with Vahli Dikri Yojna form filling, paediatric health camp and Baby health kit distribution at Mundra. Mrs. Ashaben-CDPO Mundra was remain present in this event. Total 61 forms has received approval letter from GOG and 15 forms filled upon the same day. • Adani Foundation is working with 15 Self help group and supporting to develop entrepreneur skills to become self reliant, sourcing more than 350 women to absorb in various job –this will give them identity, confidence and right to speak in any decision for home, village and working area. About INR 4977.63 lakhs has been spent on various CSR activities in the Mundra region since April 2018 till Mar 2021 including cost of community health and education for woman and girl child.
10.4	Due to economic growth leading to rapid urbanization, which prompts the	Level-2	Adani hospitals, Mundra is setup by Adani group near Samudra township with a goal to provide	APSEZ will explore other possibilities to augment the primary and secondary healthcare facilities in future	APSEZ	Long Term	Adani hospitals (Multi-specialty), Mundra is having 110 bed facility and same is setup by Adani group near Samudra township. Primary health center and community health center are in place within the Mundra taluka.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
	need for healthcare facilities in the region. For an influx of 6 lakh people from APSEZ operations and additional 3 Lakh from induced growth by the year by 2030 (fully developed scenario), total hospitals facilities with about 540 beds would be required.		primary and secondary health care services to Adani group employees and the local populace of Mundra. The existing 100 bed Adani hospital at Mundra has been catering the services ranging from wellness and preventative care.	depending on the growth scenario at APSEZ development.			Other than this Adani foundation is doing various activities as part of community health. The details of last year are as below. Adani foundation has spent approx. INR 4977.63 lakhs from April – 2018 to Mar – 2021 for CSR activities cost including cost of community health. • Mobile Heath Care Units and Rural Clinics • 9 Rural Clinics • 06 from Mundra, 02 from Anjar & 01 from Mandvi block treated; • 3843 patients • 31 villages covered, with 94 types of general and lifesaving medicines through Mobile healthcare unit • 3364 patients benefited during six months • 06 patients are provided Dialysis treatment at 133 times with nominal charges at Adani Hospital. • 471 –Economically Challenged patients have been supported for operation, OPD, IPD, Medicines and lab-test. • For Preventive health care General and multispecialty camps Pediatric camp, General Health camps in 9 villages and Super specialist camp which benefitted more than 1100 patients of Mundra Taluka. • 16 Senior Citizens have been linked with Government Niradhar pension scheme, 34 senior Citizens linked up with Ayushman Yojana and 67 Senior Citizens were referred to GKGH Bhuj for chronic illness. Other than this, Adani Foundation has also worked for fight against COVID – 19 pandemic situations for last two years. Present Hospital facilities are adequate to avail the medical treatment for Mundra region considering present development. Other Occupational Health centres, primary

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
							health centres and community health centres are also in place in Mundra to take care the people residing in Mundra. Adani group is also operating high quality health care services to the people of Kutch at G. K. General Hospital, Bhuj having 750 beds facilities on public private partnership (PPP) model, which is 60 km far from Mundra. APSEZ will explore other possibilities to augment the primary and secondary healthcare facilities in future depending on the future development at APSEZ.
10.5	Due to rapid economic development in the region, several employment opportunities can be generated to the local people. When the area is fully developed by the end of 2030, the working population of the Mundra taluk would increase from		APSEZ has been giving preferences to people from Gujarat for providing employment opportunities based on eligibility and skills. In Mundra, special programmes have been conducted by Adani Foundation to enhance the employability of youth from fisherfolk	APSEZ is committed to provide support for fishermen livelihood activities and has submitted a detailed 5 years plan to MoEF&CC with a total budget of Rs.13.5 Cr.	APSEZ	Short Term	Following support provided during this compliance period as a fisherfolk livelihood. • Average 75 KL of water was supplied to 676 households at 5 fisherman vasahat on a daily basis under Machhimar Shudhh Jal Yojana and other 4 fisherman vasahat has linkaged with Narmada water through GWIL and Mundra Gram Panachayat from which 355 households get benefited. • 11 Fisher Youth were interviewed among that 5 have been selected. Our target is to support 60+ Fisherman in alternative livelihood till March 2022. • Facilitation of Pagadiya Welfare scheme & boat license sanction letter to 06 Fishermen. Till date 59 Form has been submitted to fisheries department, Bhuj for pagadiya and boat License. • During the Taukate cyclone fishermen family had been shifted to safe Places As well as support to disaster management team for advance preparation. • To promote Natural farming Adani Foundation has originated cow-based farming initiative with

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
	current level of 55,000 to as high as 4,00,000, which will be 45%of the total envisaged population in Mundra Taluk by the end of 2030.		communities. Based on the need assessment results, several livelihood options have been introduced by the Adani Skill Development Centre, Mundra. In these centres, youth can join and get vocational training for a number of technical and non-technical skills. An industrial Training Institute is set up at APSEZ, Mundra, to enhance the skill levels of the local youth to maximum				interconnected techniques which can increase farmer yield. • 23 wormicompost unit have been set-up. Which is facilitated through Government with farmer Contribution. • 50 Farmers have started to preparing Jiva Mrut & Gaukrupa Amrutam Bio-fertilizer and using in agricrop. Series of Training is arranged by ATMA and Adani Foundation. • Two Farmers Groups is registered with ATMA–Agricultural technology management Agency–it will leverage Government schemes. • Adani Foundation provides Good Quality dry and green fodder to 24 Villages. Project is covering total 14116 Cattels / 3008 farmers and hence enhancing cattle productivity. Dry Fodder 895398 Kg Green –2425230 Kg. • Fodder Cultivation-To made fodder sustain villages -25 Acre Gauchar land of Siracha village is being cultivated for the same. • Current year for the dates Packaging and Marketing, KKPC Started to sell 10 Kg capacity packaging Box at Minimum Profit Margin At Rs.29/Boxes which resulted in turn over of Rs. 24 Lacs with Profit of 1 Lac. This initiative has supported more than 1800 farmers indirectly. • Dragon fruit farming is on going by Five farmers each farmer is doing in 2 Acre farm –Total 11000 plants. • Skill Development and Income Generation –Adani Foundation is working with 15 Self help group and supporting to develop entrepreneur skills to become self reliant, sourcing more than 350 women to absorb in various job.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
			possible extent.				APSEZ is carrying out various initiatives specific to the Fisherfolk community which includes: • Vidya Deep Yojana • Vidya Sahay Yojana – Scholarship Support • Adani Vidya Mandir • Fisherman Approach in SEZ • Machhimar Arogya Yojana • Machhimar Kaushalya Vardhan Yojana • Machhimar Sadhan Sahay Yojana • Machhimar Awas Yojana • Machhimar Shudhh Jal Yojana • Sughad Yojana • Machhimar Akshay kiran Yojana • Machhimar Suraksha Yojana • Machhimar Ajivika Uparjan Yojana • Bandar Svachhata Yojana These initiatives are planned for the period 2016 – 2021 with a committed expense of INR 13.5 Cr as submitted earlier in detail in the report namely “Silent Transformation of Fisher folk at Mundra”, . Till, Sep’21 approx. 9.78 Cr. INR, has already been spent in support for fishermen livelihood activities.

TEST REPORT FOR WATER SAMPLE

QF/7.8/19-WT

Page: 1 of 2

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED **C/O. ENVIRONMENT CELL, 3rd FLOOR,** **ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,** **TALUKA-MUNDRA, DIST-KUTCH-370421**	Test Report No. : **PL/AM 0735** Issue Date : **31/08/2021** Customer's Ref. : **As Per W.O.**

Description of Sample	:	**Nr. ATT -2A**			
Sampling Date	:	**24/08/2021**	Quantity/No. of Samples	:	**05 Lit/One**
Sampling By	:	**Pollucon Laboratories Pvt. Ltd.**	Sampling Procedure	:	**Grab**
Sample Receipt Date	:	**25/08/2021**	Lab ID	:	**AM/2108/68**
Packing/ Seal	:	**Sealed**	Test Parameters	:	**As per table**
Date of Starting of Test	:	**25/08/2021**	Date of Completion	:	**31/08/2021**

RESULT TABLE

SR NO	TEST PARAMETERS	UNIT	RESULT	TEST METHOD
			Nr. ATT -2A	
1	Colour	Co-pt	10	IS 3025 (Part – 4) 2017
2	Odour	--	Agreeable	IS 3025 (Part – 5) 2019
3	Total Suspended Solids	mg/L	21	IS 3025 (Part – 17) 2017
4	pH	--	7.43	IS 3025 (Part – 11) 2017 Electrometric Method
5	Temperature	°C	29.8	IS 3025 (Part–9) 2017
6	Oil & Grease	mg/L	Not Detected	APHA(23rd Edition) 5520 B 2017
7	Total Residual Chlorine	mg/L	Not Detected	APHA(23rd Edition 2017) 4500 Cl G-DPD colorimetric method
8	Ammonical Nitrogen	mg/L	1.85	IS 3025 (Part-34) 2019 Nesslerization Method
9	BOD	mg/L	6.0	IS 3025 (Part–44) 2019
10	COD	mg/L	48	APHA (23rd Edition 2017) 5220 B Open Reflux Method
11	Arsenic as As	mg/L	Not Detected	APHA (23rd Edition 2017) 3114 B
11	Mercury as Hg	mg/L	Not Detected	APHA (23rd Edition 2017)3112 B
12	Lead as Pb	mg/L	Not Detected	APHA (23rdEdition 2017) 3111 B
13	Cadmium as Cd	mg/L	Not Detected	APHA (23rdEdition 2017) 3111 B

Continue...

H. T. Shah
Lab. Manager

Dr. Arun Bajpai
Lab Manager (Q)

Note: This report is subject to terms & conditions mentioned overleaf.

TEST REPORT FOR WATER SAMPLE

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED **C/O. ENVIRONMENT CELL, 3rd FLOOR,** **ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,** **TALUKA-MUNDRA, DIST-KUTCH-370421**	Test Report No. : **PL/AM 0735** Issue Date : **31/08/2021** Customer's Ref. : **As Per W.O.**

RESULT TABLE

SR NO	TEST PARAMETERS	UNIT	RESULT	TEST METHOD
			Nr. ATT -2A	
14	Hexavalent Chromium as Cr^{+6}	mg/L	Not Detected	APHA (23rdEdition 2017) 3500 Cr B Colorimetric method
15	Total Chromium	mg/L	Not Detected	APHA (23rd Edition 2017) 3111 B
16	Copper as Cu	mg/L	Not Detected	APHA (23rd Edition 2017) 3111 B
17	Zinc as Zn	mg/L	Not Detected	APHA (23rdEdition 2017) 3111 B
18	Selenium as Se	mg/L	Not Detected	APHA (23rd Edition2017) 3114 B
19	Nickel as Ni	mg/L	Not Detected	APHA (23rd Edition 2017) 3111 B
20	Cyanide as CN	mg/L	Not Detected	APHA (23rd Edition 2017) 4500 CN E Colorimetric Method
21	Fluorides as F	mg/L	0.60	APHA (23rd Edition 2017) 4500 F D SPANDS Method
22	Dissolved Phosphate as P	mg/L	0.027	IS 3025 (Part-16) 2017
23	Sulphides as S	mg/L	Not Detected	APHA (23rd Edition 2017) 4500 S2 F Iodometric method
24	Phenolic Compound as C_6H_5OH	mg/L	Not Detected	IS 3025 (Part – 43) 2019 Aminoantipyrine Method
25	Bio-assay Test	%	90% survival offish after 96hours in 100%sample	OECD 203 B/IS: 6582-2001
26	Manganese as Mn	mg/L	Not Detected	APHA (23rd Edition 2017) 3111 B
27	Iron as Fe	mg/L	0.10	APHA (23rd Edition 2017) 3500 Fe B
28	Vanadium as V	mg/L	Not Detected	APHA (23rd Edition 2017) 3111 B
29	Nitrate Nitrogen as N	mg/L	0.11	IS 3025 (Part-34) 2019 Spectrophotometry

Not Detection Limit: Oil & Grease :2.0 mg/L, Total Residual Chlorine:0.2 mg/L Arsenic as As : 0.001 mg/L, Mercury as Hg:0.0006 mg/L , Lead as Pb : 0.02 mg/L, , Cadmium as Cd : 0.004 mg/L,Total Chromium : 0.05 mg/L, Copper as Cu : 0.02 mg/L , Zinc : 0.05 mg/L, Selenium as Se:0.008mg/L, Hexavalent Chromium as Cr+6:0.05 mg/L, Nickel as Ni:0.02 mg/L, Cyanides as CN: 0.01 mg/L, Sulphides as S:0.1 mg/L, Phenolic Compound as C6H5OH: 0.01mg/L, Vanadium as V:0.25 mg/L,Manganese as Mn: 0.03.

H. T. Shah
Lab. Manager

Dr. Arun Bajpai
Lab Manager (Q)

Note: This report is subject to terms & conditions mentioned overleaf.

"Pollucon House", Plot No.5/6, Opp.Balaji Industrial Society, Old Shantinath Silk Mill Lane, Near Gaytri Farsan Mart, Navjivan Circle,Udhana Magdalla Road, Surat-395007, Gujarat, India.
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TEST REPORT FOR WATER SAMPLE

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED **C/O. ENVIRONMENT CELL, 3rd FLOOR,** **ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,** **TALUKA-MUNDRA, DIST-KUTCH-370421**	Test Report No. : **PL/AM 0736** Issue Date : **31/08/2021** Customer's Ref. : **As Per W.O.**

Description of Sample	:	**Nr. ATT -4**			
Sampling Date	:	**24/08/2021**	Quantity/No. of Samples	:	**05 Lit/One**
Sampling By	:	**Pollucon Laboratories Pvt. Ltd.**	Sampling Procedure	:	**Grab**
Sample Receipt Date	:	**25/08/2021**	Lab ID	:	**AM/2108/69**
Packing/ Seal	:	**Sealed**	Test Parameters	:	**As per table**
Date of Starting of Test	:	**25/08/2021**	Date of Completion	:	**31/08/2021**

RESULT TABLE

SR NO	TEST PARAMETERS	UNIT	RESULT	TEST METHOD
			Nr. ATT -4	
1	Colour	Hazen	5.0	IS 3025 (Part – 4) 2017
2	Odour	--	Agreeable	IS 3025 (Part – 5) 2019
3	Total Suspended Solids	mg/L	26	IS 3025 (Part – 17) 2017
4	pH	**--**	7.73	IS 3025 (Part – 11) 2017 Electrometric Method
5	Temperature	^{o}C	30.0	IS 3025 (Part–9) 2017
6	Oil & Grease	mg/L	Not Detected	APHA(23rd Edition) 5520 B 2017
7	Total Residual Chlorine	mg/L	Not Detected	APHA(23rd Edition 2017) 4500 Cl G-DPD colorimetric method
8	Ammonical Nitrogen	mg/L	1.96	IS 3025 (Part-34) 2019 Nesslerization Method
9	BOD	mg/L	5.0	IS 3025 (Part–44) 2019
10	COD	mg/L	39	APHA (23rd Edition 2017) 5220 B Open Reflux Method
11	Arsenic as As	mg/L	Not Detected	APHA (23rd Edition 2017) 3114 B
11	Mercury as Hg	mg/L	Not Detected	APHA (23rd Edition 2017)3112 B
12	Lead as Pb	mg/L	Not Detected	APHA (23rdEdition 2017) 3111 B
13	Cadmium as Cd	mg/L	Not Detected	APHA (23rdEdition 2017) 3111 B

Continue...

H. T. Shah
Lab. Manager

Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR WATER SAMPLE

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED **C/O. ENVIRONMENT CELL, 3rd FLOOR,** **ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,** **TALUKA-MUNDRA, DIST-KUTCH-370421**	Test Report No. : **PL/AM 0736** Issue Date : **31/08/2021** Customer's Ref. : **As Per W.O.**

RESULT TABLE

SR NO	TEST PARAMETERS	UNIT	RESULT	TEST METHOD
			Nr. ATT -4	
14	Hexavalent Chromium as Cr^{+6}	mg/L	Not Detected	APHA (23rdEdition 2017) 3500 Cr B Colorimetric method
15	Total Chromium	mg/L	Not Detected	APHA (23rd Edition 2017) 3111 B
16	Copper as Cu	mg/L	Not Detected	APHA (23rd Edition 2017) 3111 B
17	Zinc as Zn	mg/L	Not Detected	APHA (23rdEdition 2017) 3111 B
18	Selenium as Se	mg/L	Not Detected	APHA (23rd Edition2017) 3114 B
19	Nickel as Ni	mg/L	Not Detected	APHA (23rd Edition 2017) 3111 B
20	Cyanide as CN	mg/L	Not Detected	APHA (23rd Edition 2017) 4500 CN E Colorimetric Method
21	Fluorides as F	mg/L	0.54	APHA (23rd Edition 2017) 4500 F D SPANDS Method
22	Dissolved Phosphate as P	mg/L	0.021	IS 3025 (Part-16) 2017
23	Sulphides as S	mg/L	Not Detected	APHA (23rd Edition 2017) 4500 S2 F Iodometric method
24	Phenolic Compound as C_6H_5OH	mg/L	Not Detected	IS 3025 (Part – 43) 2019 Aminoantipyrine Method
25	Bio-assay Test	%	90% survival offish after 96hours in 100%sample	OECD 203 B/IS: 6582-2001
26	Manganese as Mn	mg/L	Not Detected	APHA (23rd Edition 2017) 3111 B
27	Iron as Fe	mg/L	0.13	APHA (23rd Edition 2017) 3500 Fe B
28	Vanadium as V	mg/L	Not Detected	APHA (23rd Edition 2017) 3111 B
29	Nitrate Nitrogen as N	mg/L	0.08	IS 3025 (Part-34) 2019 Spectrophotometry

Not Detection Limit: Oil & Grease :2.0 mg/L, Total Residual Chlorine:0.2 mg/L Arsenic as As : 0.001 mg/L, Mercury as Hg:0.0006 mg/L , Lead as Pb : 0.02 mg/L, , Cadmium as Cd : 0.004 mg/L,Total Chromium : 0.05 mg/L, Copper as Cu : 0.02 mg/L , Zinc : 0.05 mg/L, Selenium as Se:0.008mg/L, Hexavalent Chromium as Cr+6:0.05 mg/L, Nickel as Ni:0.02 mg/L, Cyanides as CN: 0.01 mg/L, Sulphides as S:0.1 mg/L, Phenolic Compound as C6H5OH: 0.01mg/L, Vanadium as V:0.25 mg/L., Manganese as Mn: 0.03

H. T. Shah
Lab. Manager

Dr. Arun Bajpai
Lab Manager (Q)

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Annexure – 16

Organogram of Environment Management Cell, APSEZ, Mundra